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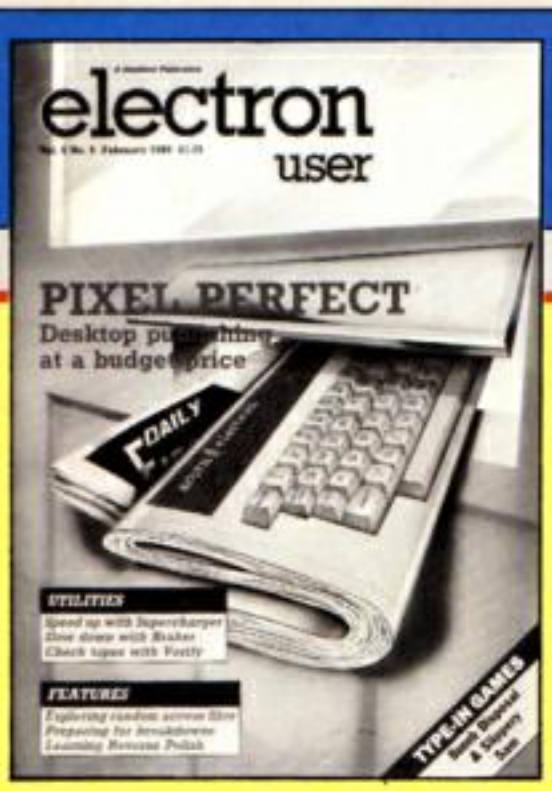

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BBC B+/Master 80T		2241		2244		2250
Atari ST		9192		9193		9194
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electron user NEWS

SOFTWARE AID FOR CHARITY

IN return for a donation to Barnardo's, Electron users can get free software from Supersoft (01-861 1166).

The Harrow based software house is giving away £50,000 worth of programs to raise money for the childrens' charity

Peter Calver, managing director of Supersoft, said: "We have a large supply of surplus software programs from the last five years and we want to put them to good use. Anyone who writes to us enclosing a donation to Barnardo's will receive a program.

"Normally these would be the sort of programs you would find on market stalls, but since we get very little money from that outlet we decided to put them to better use.

"We hope that other software firms who have surplus stock may donate it to charity".

David Batterbury, director of the London and East Anglia region of Barnardo's, said: "We're very grateful to Supersoft. We hope that people will take up this offer and be as generous in their donations as Supersoft has already been".

Cheques and postal orders should be made payable to Barnardo's and sent to Barnardo's Offer, Winchester House, Canning Road, Wealdstone, Harrow, HA3 750.

Top US games coming

ELECTRON users will be treated to the best from the USA throughout 1989 on the games front.

Tynesoft (091-414 4611), going all out to get the license for more American products, is to develop its design links with New York-based Subway Software.

"Everything we will be doing in 1989 will be either designed or licensed in the States", said Tynesoft boss David Croft.

"When we got the licence for Superman, Subway Software sent us a 100 page games specification and we were so impressed that we intend to use Subway as much as we can".

The American connection is already going well with Tynesoft's two latest games on the Electron. Previewed in the December Electron User, *they are now available.*

Superman is built round a comic book on three skill levels. The player takes the role of Superman, doing his best to save the world from evil threats. There are six games progressing through the comic strip.

Circus Games is Tynesoft's second new venture.

Taking the player into the big top it features tightrope walking, trapeze, lion taming and bareback riding.

Both games have been brought out on tape alone for the Electron but if there is enough demand Tynesoft will produce them on disc.

The tape versions cost £9.95.

DESKTOP publishing is the latest growth market for Electron users. Hot on the heels of AVP's Pixel Perfect, reviewed in this issue, Slogger (0272 237496) has brought out its Electron version of the well known AMS package Stop Press.

It allows text to be entered direct from the keyboard or from a text file and displayed in a variety of standard fonts. A font designer is also included for other styles.

Digitised pictures and screen dumps can be manipulated to suit page design and full graphics capabilities are part of the package.

The software includes two roms plus 3.5in and 5.25in DFS discs and costs £49.99. A special offer of a mouse, user port and software combination costs £85.

Competition winners

Two opportunities to test your general knowledge came your way in competitions in the September and October issues of *Electron User*. The first prizes were some superb hardware add-ons for your Electron – from ram to a fantastic music system.

The first correct entry in the Pres competition was from A. Braley from Aylesbury who will be receiving a copy of the Advanced Plus 3 plus Welcome disc, utilities, power supply and interface and three enjoyable games – Snapper, Draughts and Reversi.

Next out of the sack was T. Stevens from Warley who will be receiving an Advanced Battery Backed Ram plus several useful utilities.

Ten runner-up prizes of the Advanced Games Compendiums Volumes I-III are being sent to D Smith, Braintree; N Tovey, Rugby; R Avty, Connah's Quay; S Johns, Hindhead; H Gamble, Birmingham; J Lowe, Rainham; M Billingham, London; D Clamp, Durham; B Hume, Halstead and S Hoben, Newry.

For the more musically inclined came a chance to win a Music 5000 from Hybrid Technology.

Winner was C Davey from Bury who will soon be receiving his Music 5000 synthesiser which will allow him to turn his Electron into a digital synthesiser with programmable instruments, mixing desk, stave editor and its own music composition language.

The next 10 winners received a cuddly teenage Repton from Superior Software: T Tuke, Stubbington; G Wass, Rothley; J Clifford-Davies, Ottery St Mary; P Shodeke, London; G Saxty, Runcorn; A Sloan, Girvan; J Gay, Retford; C McKail, Stranraer; R Waugh, Grimsby and R Smith, Broughton.

And 100 runners-up will get a copy of Mike Bibby's Getting Started in BBC Basic look.

★ ★ ★

WINNERS of *Electron User's* Barbarian competition sponsored by Superior Software Richard Williams and Martin Freeman travelled to Cardiff for their prize of a day with the Barbarians RU team.

Electron is a girl's best friend

WHILE diamonds may be a girl's best friend when she gets older, the Electron is her best friend in the classroom.

Fears that girls miss out on technology lessons have been put down to their lack of confidence. They feel worried by new models and are more at home with familiar machines such as the Electron.

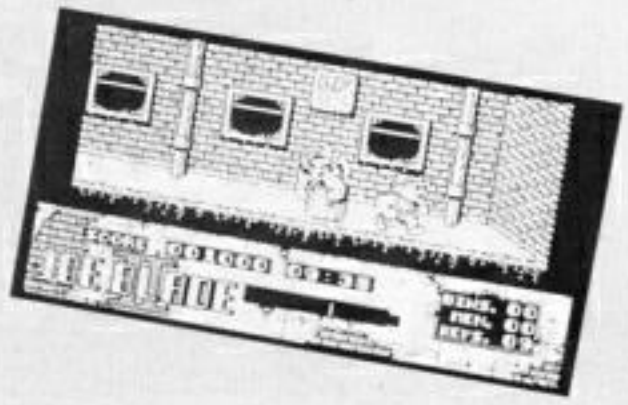
Computers are being seen as pre-eminently male machines according to a recent report from Professor Cynthia Hoyles of London University.

A government working party has also advised that compulsory design and technology lessons to be introduced in 1990 should not turn girls off.

But a spokeswoman for the schools division of the Equal Opportunities Commission told Electron User *that the fault does not lie wholly with boys hogging the machines.*

"Evidence suggests that some girls are nervous and wary of computers", she said. "When they do start to use them, they are just as good with them as the boys. Models that have been in schools for some time are more familiar to them and can help to overcome their initial fears".

Gallup Software Chart



THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	1	FRANKENSTEIN 2000 *Atlantis*	The third month at number one. You will enjoy this if you're a fan of things that go bump in the night, combined with a little Inner Space.	1.99
2	3	COMMANDO *Encore*	Repackaged and heading up the chart. Excellent value and one you should certainly add to your collection if you have not done so already.	2.99
3	4	JOE BLADE 2 *Players*	You can read the review in this month's issue. Close on the heels of the original release, this sequel is an excellent game in its own right.	1.99
4	•	INDOOR SOCCER *Alternative*	If you have tired of the outdoor variety you can now follow the sport on the indoor circuit. Another successful budget release for Alternative.	1.99
5	•	KARATE COMBAT *Superior/Blue Ribbon*	The highest title from the new batch of releases coming from Blue Ribbon. Originally Superior Software titles, they are now at a budget price.	2.99
6	•	REPTON *Superior/Blue Ribbon*	The original concept which has spawned a generation of sequels. Should you be pining for the original, here you are, and quite inexpensive too.	2.99
7	•	PERCY PENGUIN *Superior/Blue Ribbon*	Percy has been shuffling around Electron screens for quite a few years. If he doesn't feature in your game collection you should make sure he does.	1.99
8	5	JOE BLADE *Players*	Single colour Mode 4 screens and very little sound, but a very enjoyable game which will keep you playing for many hours.	1.99
9	10	GOLDEN FIGURINE *Atlantis*	A simple but excellent way to discover the puzzles and problems of arcade adventures. Fast-moving and challenging.	1.99
10	•	VIDEO CLASSICS *Firebird*	Budget collection of some simple and fun games to play for years to come. Another title which keeps popping up. Definitely cheap and cheerful.	1.99
11	11	PLAY IT AGAIN SAM 4 *Superior*	This Superior compilation gives you Frak, the new Cosmic Camouflage, Guardian and Spellbinder. Superb value for money.	9.95
12	15	COMBAT LYNX *Alternative*	This wartime helicopter simulation sets a mission for the adventurous. A good introduction to the world of flight simulators.	1.99
13	8	MONKEY NUTS *Bugbyte*	Bug Byte has not had many new releases for quite a while and this budget title is now heading down the charts.	1.99
14	9	PLAY IT AGAIN SAM 3 *Superior*	This third Sam compilation gives you the chance to play again Commando, Killer Gorilla I & II and Palace of Magic.	9.95
15	•	MR WIZ *Superior/Blue Ribbon*	Yet another offspring from the Blue Ribbon/ Superior deal. Guide Mr Wiz around a garden full of edible cherries and dangerous gremlins.	1.99
16	20	AROUND THE WORLD IN 40 SCREENS *Superior*	As this is the time of year to plan summer holidays – why not take your little green pal around the world via the Oceans and the Arctic.	6.95
17	•	THAI BOXING *The Micro Selection*	Should you require a little exercise you can switch on to this one. Not Frank Bruno, not karate, this is martial arts with a difference.	1.99
18	•	LICENCE TO KILL *Alternative*	If you are a Fleming or 007 movie fan, then you may well be disappointed with this. As a stand alone budget title it works – just.	1.99
19	•	LIFE OF REPTON *Superior*	If you ever wondered what Repton was like as a baby you can now find out. Follow him through his life and the usual format.	6.95
20	•	OLYMPIC SPECTACULAR *Alternative*	The Olympics have gone for another four years, but if you can't wait that long have a go at this one. Pushing on in years but still good value.	1.99

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Adventures

By Pendragon

Into another year

THE cobwebs have been struck from the desk and a new broom once again sweeps the corridors of Camelot. A happy and prosperous New Year to you all – may your bread baskets be always full and don't forget to pay your tithes.

It is readers' Top Twenty time and once again the chart compiled from your votes makes very interesting reading – just look who has shot straight into the number one position.

Heyley also has two other adventures in the Top Ten with Stranded! at number five and The Taroda Scheme resting at number eight. Rarely has one company so dominated the readers' chart. This is probably a sign that more and more Electron adventurers are upgrading to disc systems thereby gaining access to these super games.

It is also interesting to observe the immediate entry of both Lee Software games, Annabel Gray and In Search of Atahaulpa. Riverdale has established itself as a thoroughbred among Electron text adventure producers with American Suds at number two and Suds consolidating its number 18 position.

Remember to keep those votes coming in. The next chart should appear in the May column.

I recently received two new adventures from the Elk Adventure Club, Reluctant Hero by Paul Waterman and Rohak the Swordsman by Aamar Mazir. Both deserve a closer look and at only £2.50 and £4.95 respectively they must be some of the best bargains around.

In Reluctant Hero you play the title role in a two part escapade in which you attempt to recover a rare element known as Trilanthium before an alien craft explodes and creates a black hole which would destroy Earth.

Rohak the Swordsman is a four parter in which you play a mighty barbarian from the northern wilderness. This adventure contains colossal quests, wizard bashing, damsels in distress and many other goodies associated with the dungeons and dragons ilk.

I must take space to thank Tim Wye for his most ornate solution to The Nine Dancers. Thanks also for correcting a slight error I made in my tutorial on how to get rid of the black dog – must have been due to too much mead at the tournament.

As Tim rightly points out, the exact procedure is: Throw the peg to the dog, then enter the hut and stuff the hare with the pixie stool. You must then give the poisoned hare to the dog at the barrow.

Many adventurers get stuck at the opening scenario to an adventure and give up too soon. This month I begin a series of maps of opening gambits which will hopefully put bewildered travellers on the right track. I begin with the opening locations to that perennial brain tickler Sphinx Adventure, and next month continue with The Puppet Man.

● *That's it for this month, so until the reaper wears pink, happy adventuring.*

Knights of the Round Table

This section is dedicated to experienced adventurers who offer their help and expertise to intrepid travellers who are stuck at various points in different adventures.

Don't forget that if you write to one of my knights for help, please enclose an sae.

Kneel and arise: Sir Low Joe, of 20 Kings Croft Gardens, Leeds LS17 6PB, who is willing to help with most Electron adventures including Project Thesius, Wychwood, Sphinx Adventure, Crown Jewels, Stranded, Stolen Lamp, Ghost Town, The Nine Dancers, Terrormolinos, Spiderman and Lords of Time.

Readers Top Twenty

1	Dreamtime	Heyley	95%
2	American Suds	Riverdale	93%
3	Village of Lost Souls	Robico	92%
4	The Lost Crystal	Epic	91%
5	Stranded!	Heyley	90%
6	Hex	Larsoft	87%
7	Twin Kingdom Valley	Bug Byte	86%
8	The Taroda Scheme	Heyley	85%
9	The Nine Dancers	Larsoft	84%
10	Axe of Kolt	Elk Adventure Club	81%
11	Dodgy Geezers	Melbourne House	80%
12	Enthar Seven	Robico	78%
13	In Search of Atahaulpa	Lee Software	77%
14	Sphinx Adventure	Acornsoft	76%
15	The Hunt	Robico	75%
16	Annabel Gray	Lee Software	73%
17	Puppet Man	Larsoft	72%
18	Suds	Riverdale	70%
19	Myorem	Robico	66%
20	Starship Quest	Elk Adventure Club	65%

Adventurer's Glossary

Screwdriver: Use it to unscrew or as a lever.
Shopkeeper: A trading post – use him for buying and selling valuable artifacts.
Shovel: For digging.
Silver: Usually a treasure but can be used to smelt a sword.
Slime: Don't touch it.
Skeleton: A deadly foe – find a way to avoid it or kill it.
Smaug: A dragon of some repute.
Smithy: Surely a good place to get things repaired.
Snake: Will need charming.
Space suit: Wear it but ensure you have a good supply of oxygen.
Spider: A fly may tempt it, and the web may prove a trap.
Stairs: Climb them or go UP or DOWN.
Star: Catch a falling star.
Stone: Push it, roll it, sling it, climb it or look for a niche within it.
Storeroom: Examine and search it thoroughly and take what you find.
Switch: Turn it on – or off.
Sword: A powerful weapon often with magical properties.

Problems Solved

This month's section contains a real potpourri of questions on an equal variety of adventures. First to be dropped through my letter box was a missive from Philippa Carson and Caroline Jones who ask for some help with that old chestnut, ***Twin Kingdom Valley****.*

The three bags of gold can be found at the following locations: One in the mountains to the North East, another at the bottom of the stairs near the grating and the last behind the silver door, below the Hall of the Forest King.

The damsels also ask how to kill the dragon and the witch. Try using the wooden staff. Ian Jackson has another problem with the same adventure. He will get the amulet if he gives the guard a diamond – basic trading really.

Philip Eglise asks me how to get on the Pnuema-Tube on Halmuris in Adventure Soft's ***Rebel Planet****. Simply prepare and WAIT for the flight, Philip. He also asks how to get through the hotel door on Halmuris. I think you need a key.*

Sarah Rickard requests some assistance with another oldie, Micropower's ***Adventure****. I think the oil has no real use in the game and you will need to kill the frog to meet the princess. Also leave all your treasures in the left luggage office.*

Carl Berry has sent me a full solution to ***Golden Baton****, for which I am very grateful. He also asks how to search the wardrobe in* ***Ten Little Indians****. I am afraid the wardrobe represents a certain kind of crimson fish, Carl.*

In an early Epic adventure, ***Quest for the Holy Grail****, Helen Grigsby seems to be having difficulty with the woodcutter. If you wish to steal his axe successfully, Helen, you must hide the article under your tunic.*

In an even older adventure, ***Five Stones of Anadon****, Carl is stymied by the ghost. Try wearing the cross and carrying the book.*

Meanwhile, Jonathan Hollingsworth is well and truly stuck in that absolute twister, ***Savage Island 1****. You need to collect two logs, the knife and the vine before you are able to construct the raft in the tidepool.*

David Noble, who last month, asked some pertinent questions about ***Suds****, now turns his attention to* ***American Suds****. Use the jelly to blast open the safe in Bobby's office in part two of the game.*

In part three go South to get past the yapping dog and take the pine needle. To escape from the cell in part four take the mattress, open the bars with the jack and escape East into the locker room.

In Kingdom of Hamil Trevor Davies asks how to get the ring from the thieving jackdaw. It's really a matter of antipodean projectiles, Trevor. Or in plain olde English, kill the jackdaw with the boomerang and the ring will obligingly drop to the ground.

Also in the same game you should eat the garlic to avoid the embraces of the enchantress and feed the steak to the hexapod.

On a different tack, Andrew Gwynne writes to ask where he can buy copies of ***The Hobbit*** *and* ***Lord of the Rings****. They do not appear to be advertised very often these days, Andrew. I can only suggest that you ring a few of the mail order companies who advertise regularly in* Electron User*. Alternatively can any readers help?*

Andrew also asks whether I am male or female. What a strange question! My long grey beard tends to point toward the former, Andrew.

Finally, I would be very grateful for any maps that readers may care to send for Blood of the Mutineers and Aussie Suds. My parchment is bare but the treasure store is full and any submissions will be well rewarded.

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◀ From Page 9

Readers' Hall of Fame

Dodgy Geezers – *Bill Zanzinger*

Go West and Up to enter the nightclub. Swordfish is the password. Soapy will be there, so buy a round of drinks, then buy two more rounds and go East to buy yet another.

When Soapy and Tweedle leave, you must immediately go West, Down, Down, East, South West, South West, South West and South to Terminal Street. Then travel South East to the amusement arcade and hang about until Mr Video turns up.

By this time it is Friday night, so you must now go North West, North, North East, South East and South to the graveyard. Wait until Tweedle and Cracker turn up, then journey North, North West and North to the service station.

Examine the station, get the wire cutters, go South, and wait until Saturday morning. Go South into the pet shop, examine the shop and get the doggi-snooze pills.

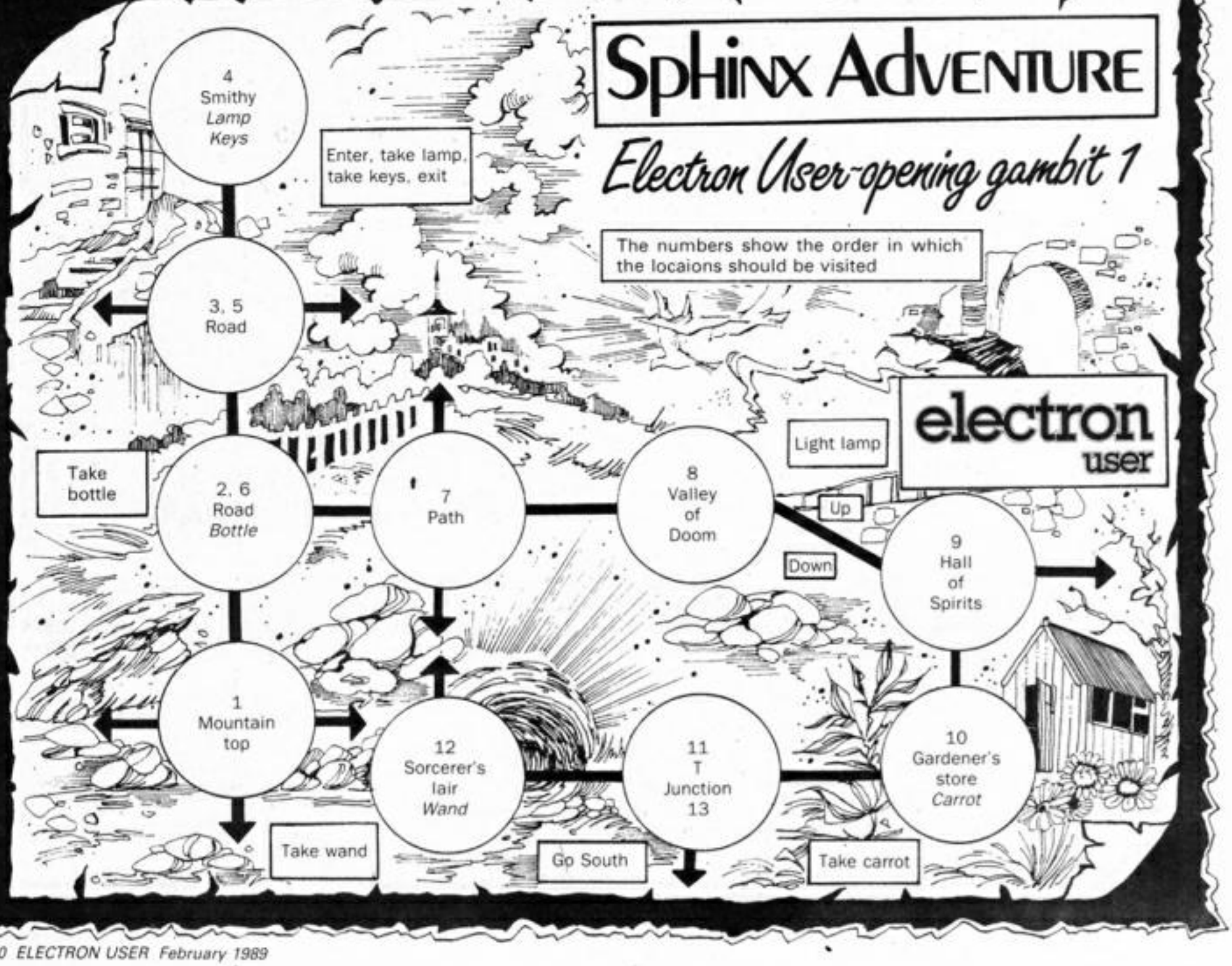
Now go North, South West, South West, West and North to the library. Say YES and go to the sewers to read the book. Now, South, East, North East, North East, North East. Wait until the pub opens, then go West into the pub.

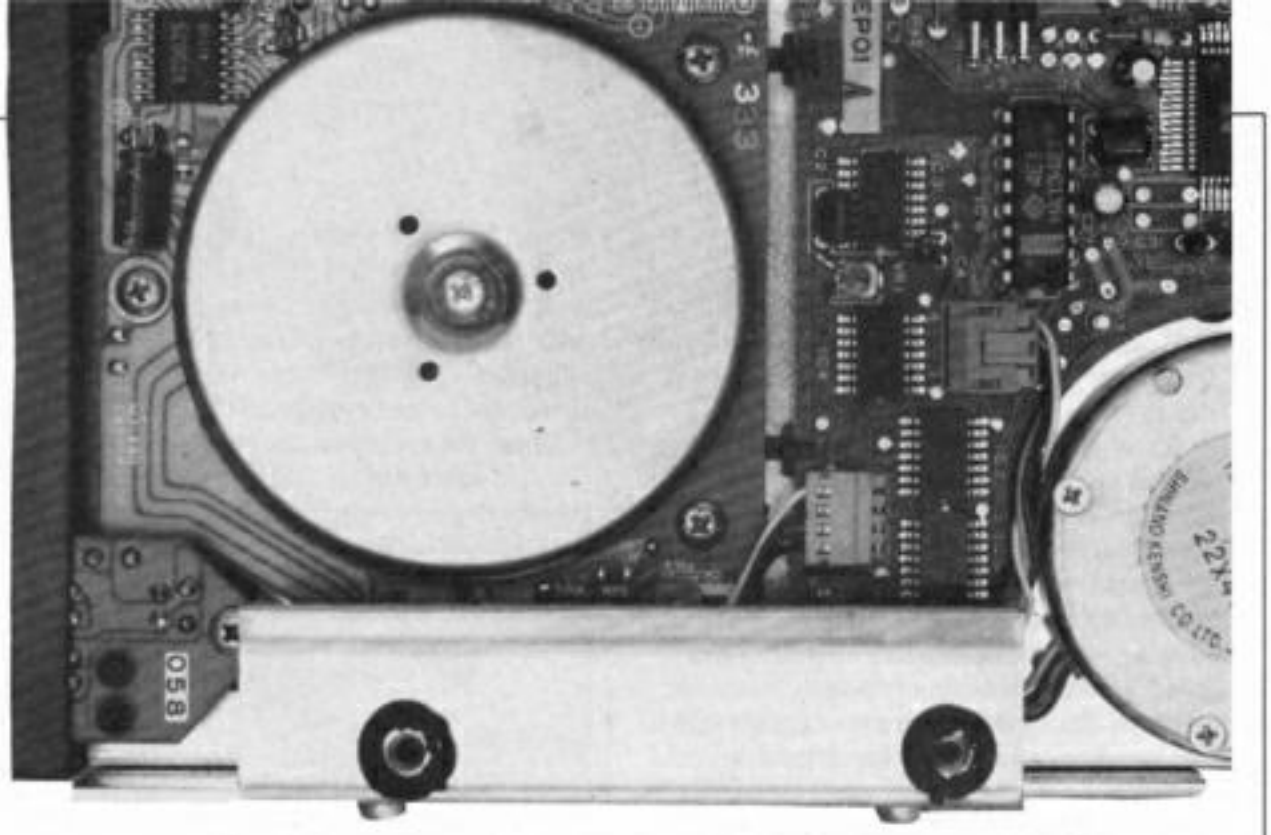
North to the phone, wait for it to ring, then answer it. Go South, East, North East and get the pickaxe. West, West to the snooker hall, reply Yes to Mr Video, then go East, East, South West, South East, South, South West, South East, South West to the alley. Hang around until the gang appears and choose: Tricks, Soapy and Mr Video. VERT ETEP is the password for part two.

(Continued next month)

SPHINX ADVENTURE

Electron User-opening gambit 1





Random thoughts

Roland Waddilove shows how you can improve the speed at which you can access the data stored away on your floppy disc

THE old proverb *"There's more than one way to skin a cat"* applies to this month's article in the series investigating the Electron's powerful disc system as we take a look at the different ways in which you can access the data stored on your discs.

The techniques outlined here will enable you dramatically to improve the speed at which you can locate and recall names, addresses, telephone numbers and so on – the stuff databases are made of.

There are two ways in which you can read and write files on disc. The simplest method is called sequential file handling and this is what we'll examine first.

Let's get to grips with it straight away by experimenting with a short example listing. Program I creates a sequential file containing 26 items – each one is called a record. To keep things simple I have used the letters of the alphabet, though it could just as easily be names, telephone numbers, addresses, stock items and so on.

Enter and run Program I. Each time an item is stored in the file it is also printed on the screen so you can visually verify what is written to the disc. Line 50 opens a file called DATA. A FOR ... NEXT loop is used for the 26 items, and BPUT# is used to create each record by writing the Ascii value of the letter to disc.

```
 10 REM PROGRAM I
 20 REM Write a serial file
 30 MODE 4
 40 character=ASC"A"
 50 file=OPENOUT"DATA"
 60 FOR item=1 TO 26
 70 PRINT "Writing record ";item;" =
";CHR$(character)
 80 BPUT#file,character
 90 character=character+1
100 NEXT item
110 CLOSE#file
```

Program I

Program II shows how we can find out what a particular record contains – in our data file this will be a single letter, or more precisely, its Ascii value. Type it in then run it. You'll be prompted to input a record number, and on entering this the program starts at the beginning and reads each item in turn until it reaches the record number you requested. It then prints out the item stored there.

This is an example of sequential file handling. As Program II searches for your record it displays on screen each item read to allow you to keep track of what it is doing. As you can see, each item is read and discarded until it finds the one you asked for.

This technique is fine for small amounts of data like this, but the time involved in scanning a very large database can be enormous. Suppose you wanted to look up the telephone number of someone called Watson. With this sequential filing system you would have to start at the begining of the telephone directory and read through each name starting with A, B, C and so on until you came to W and Watson.

Humans are much more intelligent than this and what you'd do is to open the directory somewhere near the end and skip backwards and forwards until you found Watson. The important step is that jump straight to the correct part of the directory.

You can give your Electron the same intelligence by using a technique called random access filing, and this enables you to jump directly to the record you want without having to read all the previous ones. Program III shows how this is done. Enter and run it to see it in action.

First you are prompted for a record number in the range 1 to 26, then the file is opened. Line 70 is the part that does the clever bit of jumping straight to the record you want to access, and it makes use of a pseudo variable called PTR.

The disc filing system – DFS and ADFS too – uses the variable PTR every time it accesses a file on disc. It's a pointer which tells it how many bytes it has read from the file, and it points to the next byte to be read. Initially, when a file is opened for input, it is zero, but if you read a byte from a file with BGET it is incremented so that it now points to the next byte. Every time a byte is read the value of PTR is increased by one.

If you set PTR to a particular value, say 10, then the pointer is moved past the first 10 bytes, so that when you BGET the next one from the file the 11th byte will be read. In Program III line 70 sets PTR so that the next byte read from our data file will be the correct record – *item-1* bytes are skipped so that the next record is *item*.

Our data file uses records just one byte long as we are only storing single Ascii characters, and this simplifies the positioning of the pointer, PTR. If we were storing a list of names each record may be 20 bytes long, so the first one would be at zero, the second at

Turn to Page 12 ▶

```
 10 REM PROGRAM II
 20 REM Access serial file records
 30 MODE 4
 40 PRINT
 50 INPUT "Read which record (1-26)"
;item
 60 PRINT
 70 file=OPENIN"DATA"
 80 FOR i=1 TO item
 90 byte=BGET#file
100 PRINT "Reading record ";i;" = ";
CHR$(byte)
110 NEXT
120 PRINT
130 PRINT "Record ";item;" = ";CHR$(
byte)
140 CLOSE#file
```

Program II

```
 10 REM PROGRAM III
 20 REM Random access file records
 30 MODE 4
 40 PRINT
 50 INPUT "Read which record (1-26)"
;item
 60 file=OPENIN"DATA"
 70 PTR#file=item-1
 80 byte=BGET#file
 90 PRINT
100 PRINT "Record ";item;" = ";CHR$(
byte)
110 CLOSE#file
```

Program III

20, the third at 40, then 60 and so on. To read the fourth record we would skip the first three by setting PTR to 3*20 – three times the record length.

It's quite surprising how much time you can save by using this random access filing technique. For instance, if a file was 100 records long (each one 20 bytes), then to read the last record sequentially would take around 10 seconds, but using random access filing would reduce this to less than one second – a significant saving in time.

Last month I introduced the *osgbpb* operating system call and showed how it could be put to good use by implementing an ADFS *WIPE command – it also works with the DFS, but as there's an identical one built in there's no need for it. In the final program this month I'll use another *osgbpb* call to show how to convert Program III's random access filing example into machine code.

Enter and run Program IV. It works in the same way as the previous Basic listing, so enter a record number and once it has been retrieved it will be printed on the screen.

The machine code starts at line 120 and the first task is to open the file using *osfind*. For this call the A register is set to &40, and the X and Y registers point to the name of the file. The file channel or handle is returned in the A register.

At line 190 *osgbpb* is used to read the record, and like last time you are required to set up a parameter block. In the first byte of this is stored the file handle, then comes the address at which to place the record – I've allocated a one byte buffer – followed by the number of bytes to read and the value of PTR.

When the record has been read and stored in memory the file is closed using *osfind* with the A register set to zero and the file handle in Y.

● *And with that I'll leave the topic of random access filing. Next month I'll present a memory map of the DFS workspace and show how to mend corrupted discs.*

```
  10 REM PROGRAM IV
  20 REM Random access file records
  30 MODE 4
  40 PRINT
  50 INPUT "Read which record (1-26)"
;item
  60 osfind=&FFCE
  70 osgbpb=&FFD1
  80 FOR pass=0 TO 2 STEP 2
  90 P%=&C00
 100 [ OPT pass
 110
 120 \use osfind to open file
 130 LDA #&40
 140 LDX #filename MOD 256
 150 LDY #filename DIV 256
 160 JSR osfind
 170 STA handle
 180
 190 \use osgbpb to read record
 200 STA block  \file handle
 210 LDA #3
 220 LDX #block MOD 256
 230 LDY #block DIV 256
 240 JSR osgbpb
 250
 260 \use osfind to close file
 270 LDA #0
 280 LDY handle
 290 JSR osfind
 300 RTS
 310
 320 .filename
 330 EQUS "DATA"+CHR$13
 340
 350 .handle
 360 EQUB 0
 370
 380 .block
 390 EQUB 0      \file handle
 400 EQUD buffer \load address
 410 EQUD 1      \bytes to read
 420 EQUD item-1 \PTR#
 430
 440 .buffer
 450 EQUB 0
 460 ]
 470 NEXT
 480 CALL &C00
 490 PRINT
 500 PRINT "Record ";item;" = ";CHR$(
?buffer)
```

Program IV

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electron user ARCADE CORNER

ARCADE Corner this month features a clever and unusual cheat mode from Andy Richards of Chester, Cheshire, and we also solve Turbo problems with Superior Software games.

You may have noticed that with some of the latest Superior Software titles – Play it Again Sam 4 for one – the games won't load in Turbo mode if you have a Master Ram Board. The loader runs and prints the title page, and then appears to skip the rest of the programs on tape, even though it catalogues them.

The problem appears to be an incorrect line in the loader which is supposed to disable the Plus 1. The solution is to load the loader instead of chaining it, and then to delete the offending line. The program can then be run and it will load the rest of the game.

Here is the loader for Guardian:

```
  10 ONERRORGOTO50
  20 HIMEM=&5800:*FX200,2
  30 A%=&81:X%=0:Y%=&FF:A%=(USR(&FFF4
)AND&FF00)/256:IFA%<>1 ?&224=?(&24+!&F
FB7) ELSE A%=163:X%=128:Y%=1:CALL&FFF4
:?&212=&D6:?&213=&F1:?&2AC=0
  40 $&5600="GUARDIAN/E 1.00"
  50 ONERRORA
  60 !&56F0=PAGE:CALL(PAGE+256):*OPT2
,1
  70 PAGE=&E00:CHAIN""
```

The line to delete is 30. Run the program once this is done.

Now on to Andy Richards' unusual cheat mode. It doesn't give you extra lives or enable you to skip screens, but it does add a speed control to the micro. When the going gets tough you can slow it right down and zap the aliens with ease. When you're through the tricky bit you can speed up the game again.

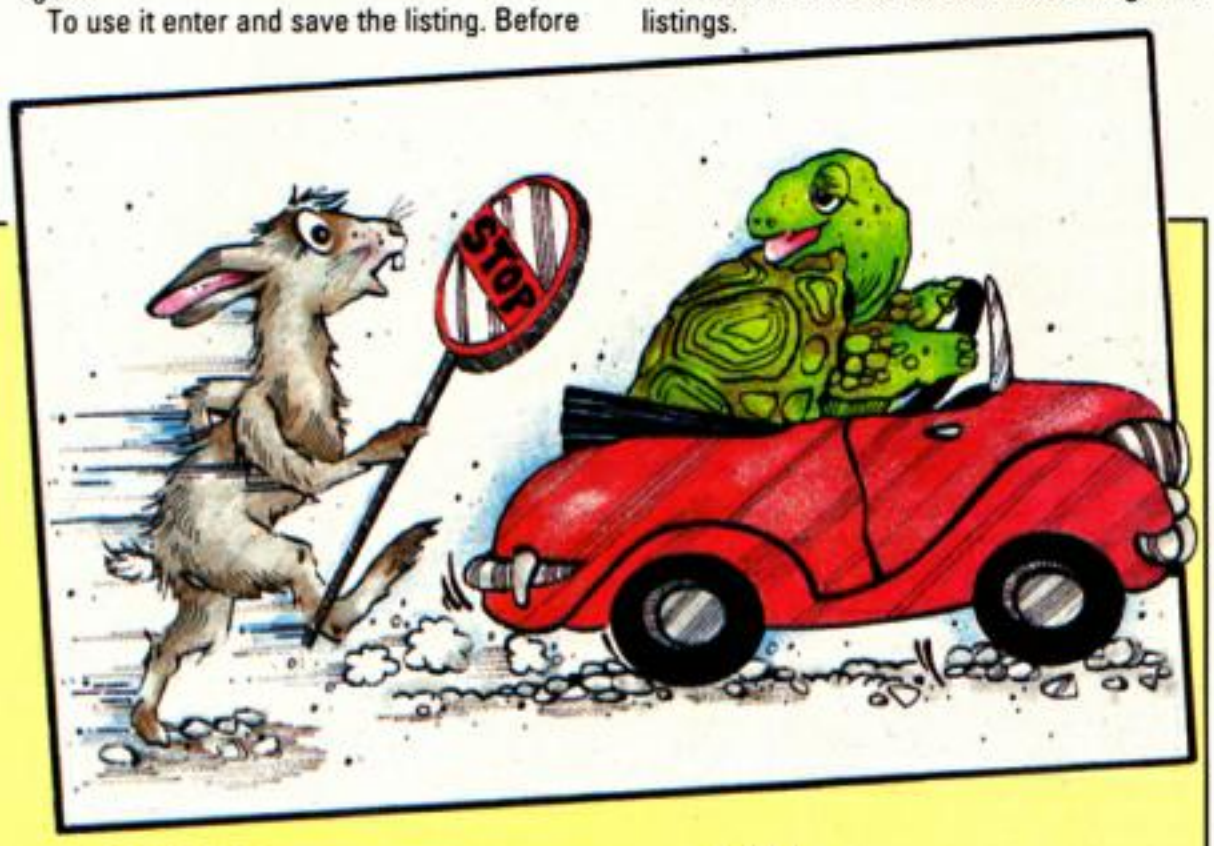
To use it enter and save the listing. Before loading your game first load and run Braker – it puts the brakes on – and press the two keys you wish to use to speed things up and slow them down, remembering not to pick any that are used in the game. When this has been done you'll be asked for the address at which to store the machine code routine. Press Return for the default, as this should be OK for most games.

Now you can load and run your piece of software. While playing the game press your pre-defined up and down keys to control its speed.

Bear in mind that this routine will not work with all software, as it intercepts the operating system osbyte call. If a game does not use this regularly, or if it resets the vector, the cheat will fail.

In practice it has been found that the older the game the more likely Braker is to work, and with compilations of old software flooding the market it should work with a fair proportion.

It should also work with most magazine listings.




```
  10 REM Braker
  20 REM By Andy Richards
  30 REM (c) Electron User
  40 MODE 6
  50 *KEY10 OLDMRUNM
  60 IF ?&20B<&80 CALL!-4
  70 PRINT ' "Braker...puts the brake
s on!"
  80 U%=FNkey("UP")
  90 D%=FNkey("DOWN")
 100 PRINT''"Where shall I store the c
ode?"
 110 PRINT"(Hit RETURN if you're not
sure)":*FX21
 120 INPUT "Address=&"a$
 130 IF a$="" a=&110 ELSE a=EVAL("&"+
a$)
 140 vector=&20A
 150 FOR i=0 TO 2 STEP 2
 160 P%=a
 170 [OPT i
 180 SEI
 190 LDA vector
 200 STA osbyte+1
 210 LDA vector+1
 220 STA osbyte+2
 230 LDA #braker MOD 256
 240 STA vector
 250 LDA #braker DIV 256
 260 STA vector+1
 270 CLI
 280 RTS
 290
 300 .braker
 310 PHP:PHA:TYA:PHA:TXA:PHA
 320 LDA #&81
 330 LDX #256-D%
 340 LDY #&FF
 350 JSR osbyte
 360 TYA:BEQ slower
 370 .faster
 380 DEC delay:BNE wait:INC delay:BNE
wait
 390 .slower
 400 LDA #&81:LDX #256-U%:LDY #255:JS
R osbyte
 410 TYA:BEQ wait
 420 INC delay:BNE wait:DEC delay
 430 .wait
 440 LDA delay:PHA
 450 LDX #0
 460 .loop
 470 DEX:BNE loop
 480 DEC delay:BNE loop
 490 PLA:STA delay
 500 PLA:TAX:PLA:TAY:PLA:PLP
 510 .osbyte
 520 JMP 0
 530
 540 .delay
 550 EQUB 1
 560 ]
 570 NEXT
 580 CALL a
 590 PRINT''"Now load and run the game
."
 600 PRINT''"BREAK disables the routin
e."
 610 END
 620
 630 DEF FNkey(a$)
 640 PRINT''"Hold down the speed "a$"
key:";
 650 K%=0
 660 K%=K%+1:IF K%=127 K%=1
 670 IF INKEY-K% ELSE 660
 680 PRINT"ok"CHR$7:*FX21
 690 IF INKEY-K% GOTO 690
 700 =K%
```

SOFTWARE

Continuing compilations

Product: Play it Again Sam 5
Price: £9.95 (tape)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

SUPERIOR Software's policy of buying up other companies or their software is having a noticeable effect upon the quality of its Play It Again compilations. Its already impressive games portfolio has been swollen with top titles from Alligata and Micro Power – some of which are in evidence in this volume.

On receiving this package I was overjoyed to see that Micro Power's Imogen had been included. It was not originally released on the Electron, and is an excellent game.

Imogen is a wizard who lost a few of his marbles as a result of a disagreement with a dragon. For his own safety, and that of the local community, he was incarcerated in a dungeon by the great wizard. He must earn his freedom by solving the dungeon's many puzzles and collecting the 16 pieces of the Spell of Release.

One of Imogen's party pieces is transformation – he can change from a wizard to a monkey to a cat at will. Each form has a different ability – the wizard can use objects, the monkey is an expert climber and the cat can leap great distances. Your desired form is selected using a series of icons at the top of the screen.

There is no time limit on the game and the only stipulation is that the 16 sections must be completed using no more than 150 transformations – if this seems generous let me assure you that it isn't. A few wasted changes as a result of badly-timed leaps can easily mean the difference between success and failure.

Puzzles range from traditional adventure game brain strainers to obvious, but difficult to execute, tests of manual dexterity. I would also add that a warped sense of humour is a distinct advantage.

Having got itself the basis of a superb game, Micro Power blended these puzzles with graphics of a quality that had never before been seen on the Electron. High resolution monochrome characters are animated with a grace and realism that brings them to life. Imogen is in a class of its own in the arcade adventure field.

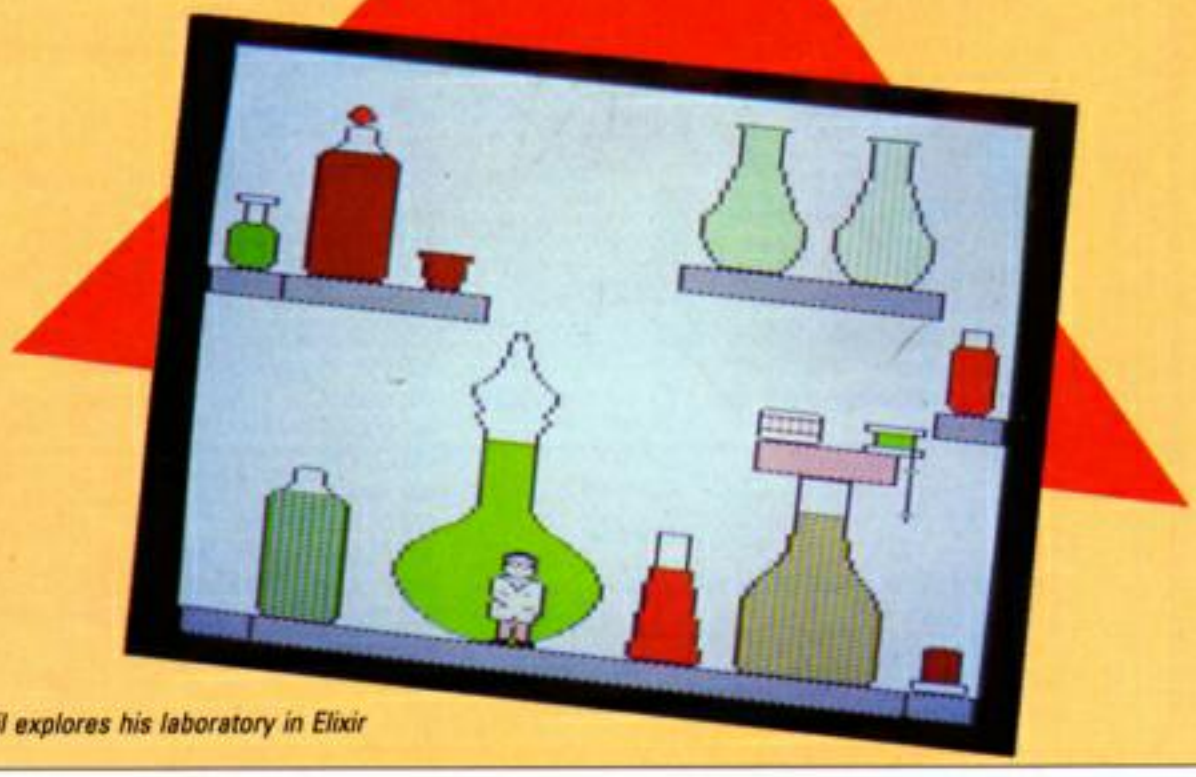
Elixir is an arcade adventure that originates from the opposite end of the quality spectrum. This is most surprising as it is the only one of the four programs on the compilation to come from the Superior stable. It revolves around the exploits of Cyril the shrunken chemist as he strives to locate the elixir that will restore him to his former stature.

Cyril clambers about shelves on which stand bottles and jars of pills and potions. The colour of a pill indicates the effect it will have upon him. His meanderings are interspersed with fatal falls, killer flash bulbs, acid drips and a runaway circular saw. This is probably the weakest game in the package .

Leaving the arcade adventure field, we take a stroll down memory lane to an arcade game of yesteryear. Bug Blaster from Alligata was, and still is, a first rate version of the insect extermination game, Centipede. Winding its way through a field of mushrooms is a giant centipede, and your task is to blast this mega-myriapod before it gets you.

The rate of the beast's descent is determined by how many mushrooms it collides with. Each collision is followed by a change in horizontal direction and one step down the screen. The mushroom population increases with each new level.

Other hazards are supplied in the shape of



Cyril explores his laboratory in Elixir

Sideways scrolling action in Moonraider

falling fleas, bouncing spiders and an assortment of other members of the insect family who traverse the screen at regular intervals. Bug Blaster is a rave from the grave that is still capable of setting the pulse racing as you fight for survival against mother nature's rejects.

The final game, Moonraider, is a cracker. In this fast-paced horizontally scrolling shoot-'em-up you control a fighter plane raiding a heavily defended enemy base. Equipped with an assault ship and a full complement of bombs, you and your trusty laser cannon set out for the centre.

The hills scroll below as you fly over them straffing rocket bases, buildings, radar towers and so on. Bombing fuel dumps adds to your rapidly dwindling fuel supply – your ship is a real gas guzzler. Any rockets you miss launch as you approach. They must either be shot down or avoided.

On later levels you enter a large cavern which must be negotiated with considerable care. Fireballs must be dodged and bouncing aliens either shot or avoided. An option which pleased me was that you can jump to any stage of the mission.

Play it again Sam 5 is yet another top quality Superior Software release that is destined for the charts, especially with the inclusion of Imogen.

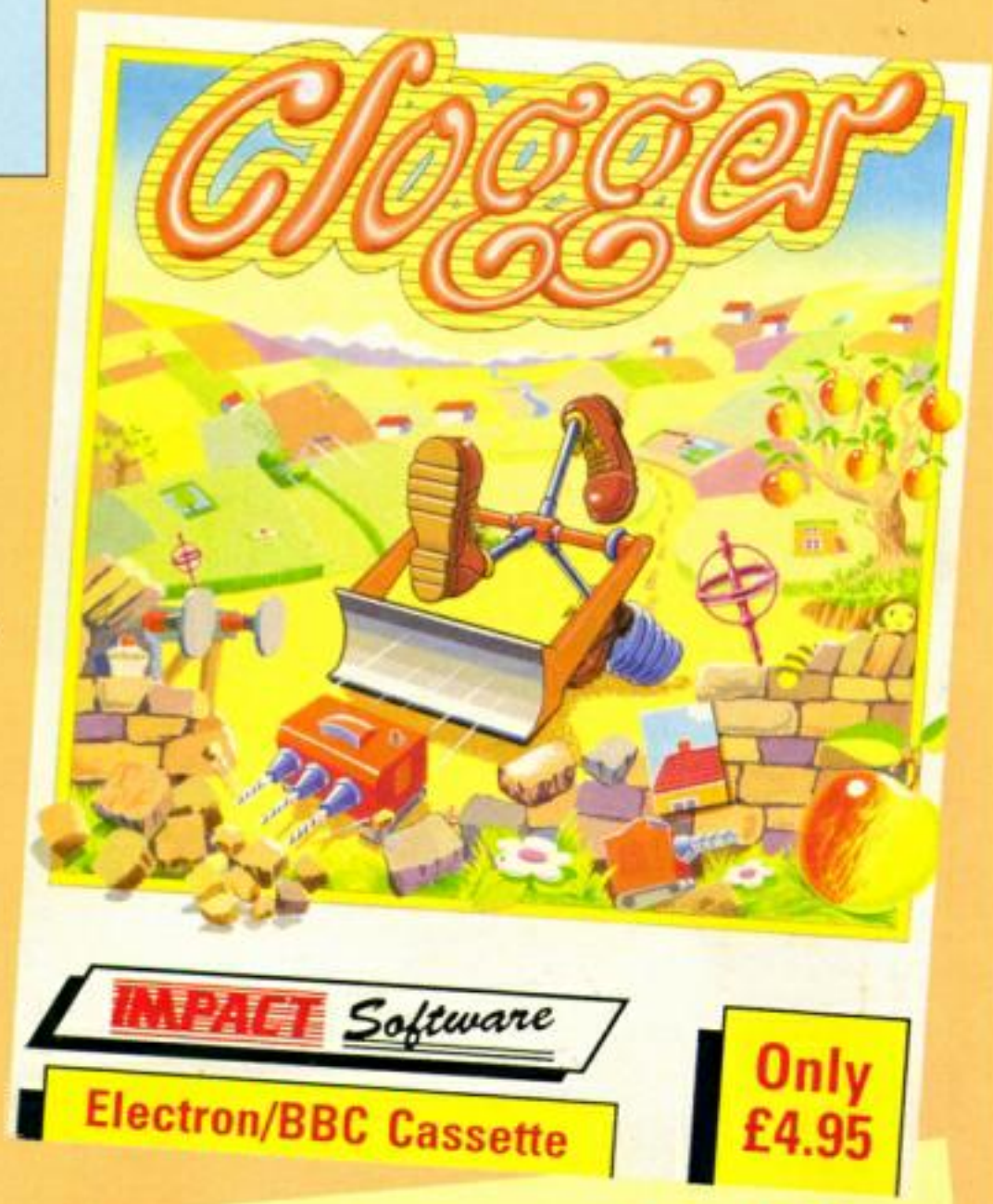
Carol Barrow

Sound	*8*
Graphics	*9*
Playability	*9*
Value for money	*9*
Overall	*9*

SecondOpinion

Another great compilation from Superior Software. Newcomers to the Electron games scene are having a field day with these top quality titles which work out at under £2.50 each. If you've had your Electron right from the beginning you probably already have two or three of these games, which would make it less of a bargain.

Janice Murray



Pretty as a picture

Product: Clogger
Price: £4.95 (tape)
Supplier: Impact Software, Neepsend House, 1 Percy Street, Sheffield S3 8AU.
Tel: 0742 769950

EVERY now and again something original and fun crops up in the Electron games market – remember Frak and the original, heady days of Repton?

Now here is a newcomer which will surely join the list of these all time classics. It's Clogger, a welcome new release from Impact who has moved on from posters, help sheets and cheats and is now producing full feature arcade games.

Cloggers lived in a strange and mysterious land in days of yore. They were totally peaceful creatures who stomped merrily around on their three feet pushing a bulldozer in front of them.

Their lack of a head in no way dimmed their intelligence – in fact they had wonderful powers of observation.

Cloggers also loved art, and it is this love that forms the main drive of the game, since in your attempt to become a Master Clogger you must find pieces of artwork and assemble them to make a complete picture.

Your aim is to complete 20 landscapes – an Electron bonus as the BBC Micro version has only 18 – by collecting the 21 picture pieces and putting them together in the finish area.

Each landscape is about 16 times the size of the screen and the scrolling is very smooth, both sideways and up and down.

Clogger in fact, stays firmly in the middle of the screen spinning his feet like a whirling Manxman while the scenery moves around him.

As well as making the picture, Clogger must also eat all the cakes which are scattered

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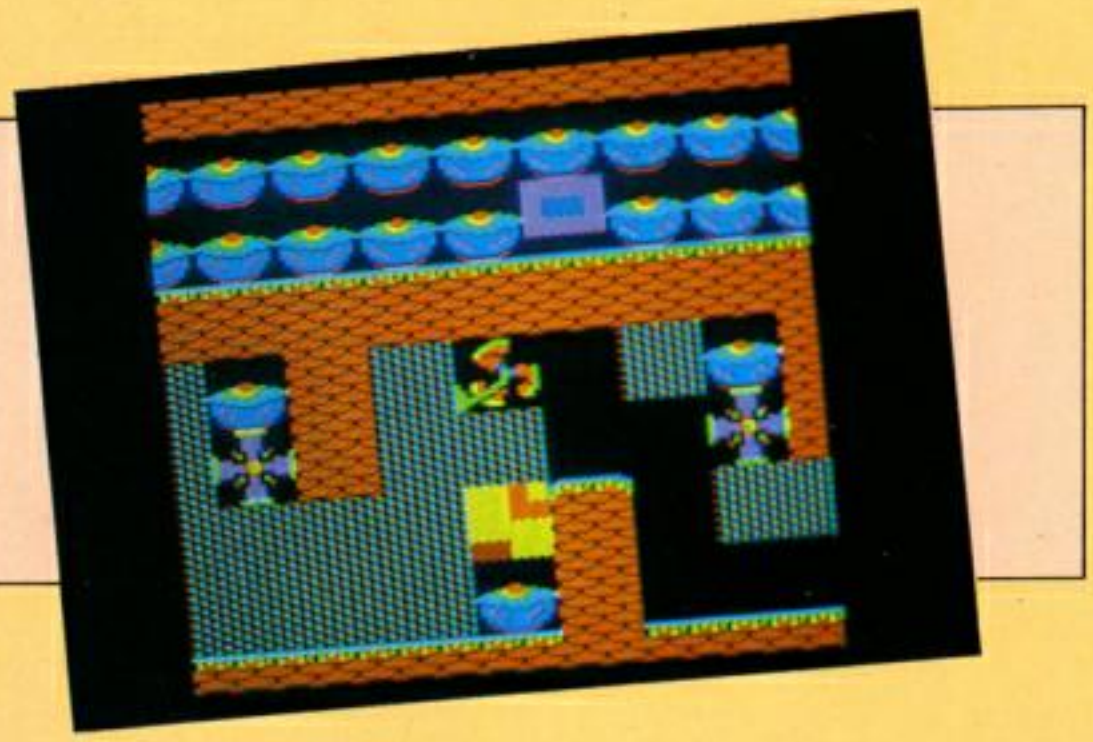

Graphics	10
Sound	6
Playability	10
Value for money	10
Overall	9

SecondOpinion

Clogger is a superb game very reminiscent of the Repton series, but there are sufficient differences for it to avoid being simply a clone. The graphics are good, and the game is very playable. The main playing screen is a little dull and an attractive border would help brighten things up a little.

If you are a fan of this type of scrolling puzzle game and would like a change from Repton's adventures I can thoroughly recommend Clogger.

Janice Murray

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around. These boost your energy and provide 30 extra seconds in which to complete your task. The maximum survival time you can have is 10 minutes, so it doesn't pay to gorge too long on cakes – far better to save them until you need them.

Apples are eaten to score points and to get them out of the way. Earth just needs removing before picture pieces can be pushed through it. The bouncy springs can cause a problem, but these can be removed if pushed from the correct side.

Apart from lack of time, there is only one fatal problem. Cloggrass grows lush and green in places. Any contact with it will cause Clogger to fade away, but it can be cut. A couple of lawnmowers can be found on each level and these remove the grass with a satisfying noise.

The other tools to be found are the drills. These can remove three thicknesses of wall – or anything else for that matter – and then they vanish. Their use must be carefully planned. There are two more scenery items. Gyroscopes will, if pushed, fly away until they hit a barrier. There they stop unless the barrier was a spring, in which case they fly back to their starting point. Buffers can be pushed around to control the wild movements of gyroscopes.

The task of completing pictures would be all but impossible if you could not access the map. Pressing M will display a clear map of the entire landscape. This shows the current positions of everything, including Clogger himself. The pieces of picture are just shown as blank tiles – no actual picture detail can be seen. Incidentally, while looking at the map, the time ticks away, so map work needs to be hasty.

It is also possible to see the completed picture by pressing P at any time. Once again, don't admire the artwork for too long. The third option is to press S to see the status screen which tells you how much time is left, how much of the picture you've completed and how many cakes you must still eat.

The status screen is a true game pause and Clogger time stands still. The game may also be ended here by pressing Escape. At first sight Clogger has many of the attributes of the Repton games. The play is similar in that your character is steered around a maze in search of goodies. Clogger, however, uses the entire screen for the game and still achieves a speedy scroll.

The characters are all large and colourful, and Clogger himself was conceived with a real touch of humour. I particularly like the way he performs a wheel spin when he bumps into a wall.

The sound consists of various beeps and noises which signify different events – pushing a gyroscope, eating an apple and so on.

Clogger is another arcade adventure which will require brain power rather than manual dexterity to solve. At its bargain price, buy it and see it race to the top of the charts.

Rog Frost

Golden boots

Product: Footballer of the Year
Price: £1.99
Supplier: Gremlin Graphics Software Ltd, Alpha House, 10 Carver Street, Sheffield, S1 4FS
Tel: 0742 753423

BEING something of an armchair soccer fan, I was curious to see what Gremlin had to offer the Electron market with this intriguing title – Footballer of the Year. So while a nicely drawn loading screen was being displayed, I had a quick glance through the English section of the instructions.

The game begins with you adopting the role of a 17-year-old professional footballer who is on the threshhold of his career. Now, with £5,000 in the bank and the entire footballing world at your feet, you endeavour to develop your status as a player. Using skill and judgement, you strive to achieve the ultimate accolade of being nominated Footballer of the Year.

With an exploratory trial under my belt, I got the impression that the gremlins had finally taken over and banished the graphics section to the broom cupboard. Having recovered from the initial shock of Gremlin without Graphics, and not being one to stand on ceremony, I decided that having been firmly rooted in the fourth division on my first attempt, a more serious approach was necessary.

When you have entered your name and selected the division you wish to start in, you are prompted to choose a team to play for. It is recommended that you start in division four, and develop your skill from there, the easiest level. Division five by the way, is the super league, and apparently not the lowest level, as I first imagined.

From here you enter into the main menu where I would advise you to experiment with the various options. I would also point out that the instructions are somewhat misleading, so you can forget about icons and an arcade section.

Once under way there is a fair bit going on; you can buy incident cards, apply for a transfer to another division and, of course, check your current status and league position. I found playing the matches a bit hit and miss. Perhaps it was the way I was standing as I took my shot? What the Q – left and W – right keys do I can only hazard a guess; per-

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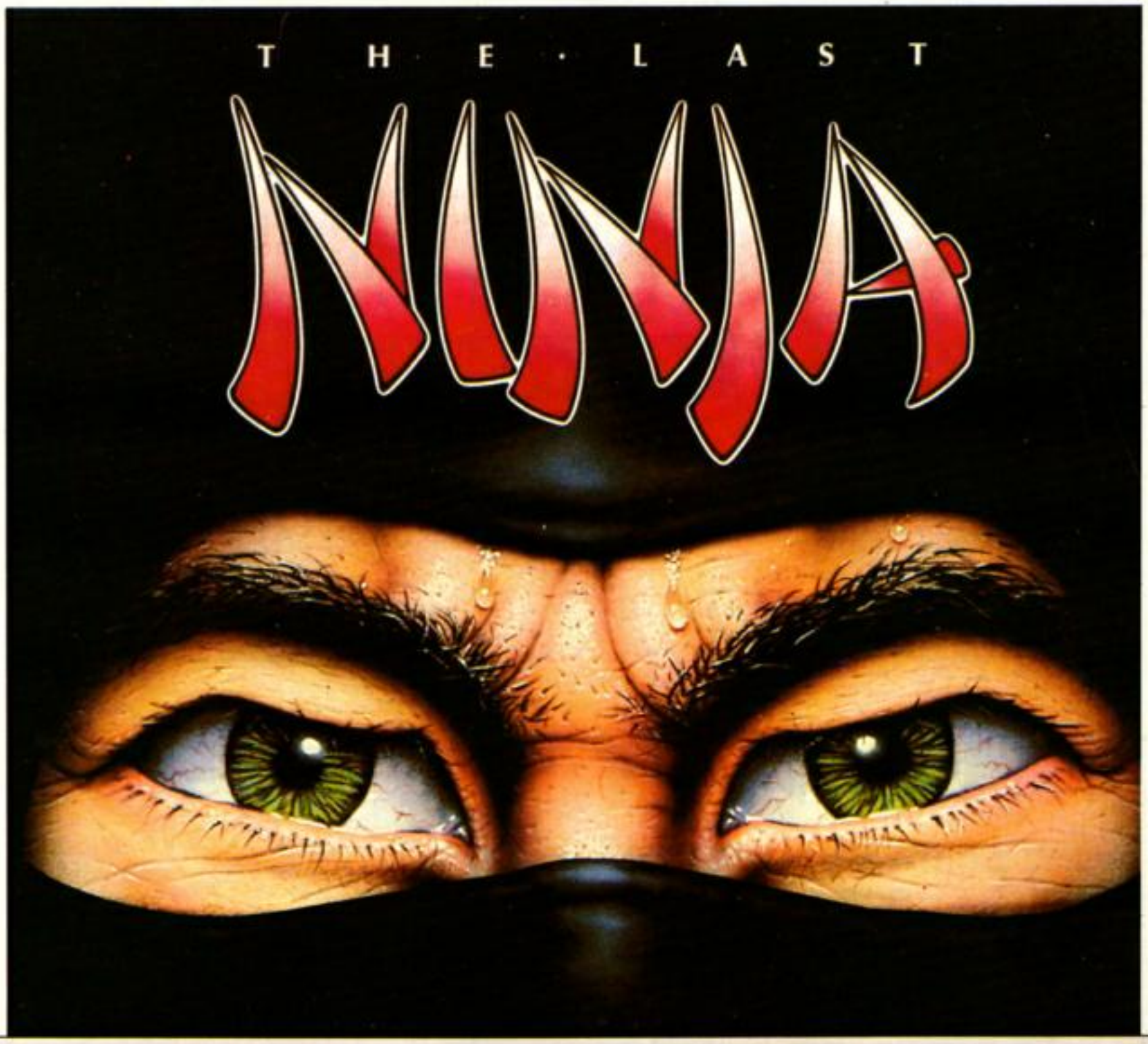

LEVEL 1

LEVEL 2

LEVEL 5

LEVEL 6

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(The screen pictures show the BBC Micro version of the game.)

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haps you may be able to find out.

I wasn't impressed with the way the league table shows only your current position. This for me, destroys any real feeling of competition. You never know the strength of the team you are playing against – it could be first or last in the division.

Judging from my own performance, the game must have a hidden strategy. However, after several unsuccessful attempts, I'm afraid I found things rather dull. Gremlin is capable of producing some excellent titles, but this falls below its usual high standards. The Electron market needs and deserves better.

Footballer of the Year offers a good challenge at a budget price, though I suspect it may be one for the connoisseur of the sport only.

Steve Bissell

Sound	*2*
Graphics	*1*
Playability	*5*
Value for money	*5*
Overall	*5*

SecondOpinion

Football simulation games always seem to do well in the software charts, and this offering from Gremlin is competing with some well established games. Like the competition, there aren't any graphics, but this doesn't detract from the gameplay at all, as the fun is in buying and selling, allocating funds and so on. A must for all soccer fans.

Janice Murray

Tricky beat-'em-up

Product:	*Joe Blade*
Price:	*£1.99*
Supplier:	*Players, Mercury House, Calleva Park, Aldermaston, Berkshire RG7 4QW.*
Tel:	*07356 77421*

AS you can no doubt guess, Joe Blade II is the sequel to Joe Blade – a game which I thoroughly enjoyed when it was released a short while back. This new version is very similar to the original and features that teenage pin up and pop idol, media celebrity, hero of the people, defender of the flag and helper of those less fortunate than himself – or so the cassette inlay claims – Joe Blade.

In this latest romp you are again in control of this do-gooder and your task is to clean up the streets of London circa 1995. No, you're not a garbage collector, though you'll find several dustbins which can be collected on your travels. You are in fact a one man police force out to reduce the rapidly increasing crime rate.

The city has gone to the dogs since 1989 and the place is crawling with muggers, skinheads, punks and the like. Anyone who ventures out into the backstreets and alleyways is quite likely to be pounced on and given a severe beating, not to mention being robbed to boot.

Your task is to patrol the city keeping a sharp lookout for shady characters and signs of trouble. Any punks you come across on your beat must be disposed of by leaping up Kung-Foo style and booting them in the head. They then disappear in a cloud of dust, but there always seem to be more just around the corner.

The object is to kill 60 or so punks and rescue 16 citizens. You'll come across the latter every now and then as you walk around.

Like the original game, the graphics are superbly detailed and the playing window – which occupies the major part of the screen – shows a 3D perspective side on view. You can walk left and right and through alleyways into and out of the screen. As you move on to the next screen it rapidly flicks up – no scrolling here.

Apart from punks, you'll come across clocks which give you extra time to clean up the city – you've got just 10 minutes – and dustbins, for which I've yet to find a use. On encountering a citizen the screen clears and up pops one of four types of puzzle. All involve re-ordering a mixed up list of the numbers one to four.

Sounds easy, but you can only swap certain pairs of numbers, and this pair is rapidly changing. To make things even harder the numbers are displayed as strange hieroglyphics, and there's a time limit too. If you don't succeed you're dead meat, and you have to start all over again. I found this part extremely difficult, which spoilt the game slightly for me.

Joe Blade II is a bit too like the original in many respects. If you have the original I would suggest you try this version before you buy it. If however, you haven't seen Joe Blade in action then it's an entertaining – if at times frustrating – game that will keep you amused for many an hour. Well worth a look.

Roland Waddilove

Sound	*7*
Graphics	*10*
Playability	*8*
Value for money	*9*
Overall	*8*

SecondOpinion

Joe Blade II is very similar to the original and it is clearly hoped that players of the first version will be clamouring to buy the second. There no doubt about it, JB II is a superb game, but I wish it differed more from the original.

The graphics are excellent, and the game is very playable. However, I too found the puzzle screens very difficult. If you haven't seen Joe Blade before either version will provide many hours of fun.

Janice Murray

Master Reverse Polish arithmetic with this fascinating simulation by Roland Waddilove

Go Forth and multiply

FIRST became hooked on the Forth programming language when the Jupiter Ace appeared way back in 1982, a good six months or so before the Electron was released. It is an interesting language, originally developed in the late 60s for control applications at Jodrell Bank no less.

One of its more notable and controversial features is its use of Reverse Polish arithmetic and stack structure. This topic often puts off would be Forth programmers, as to the casual observer it appears to be a very strange and complex concept. In fact, once learnt, it is very simple indeed and a delight to use compared to traditional maths.

This program will allow you to experiment with Reverse Polish, entering simple problems and equations, but it is not a Forth compiler. The screen display shows a number of windows, each providing some information about the system. The main one on the left shows the contents of the stack, an area of memory set aside to store any numbers entered.

To the right are the Input and Command History windows. The best way to see how the system works is to try a few examples. For instance, enter a number – an integer, not a floating point number – and see how it is stored on the stack. The number will appear in the window on the left.

The first number entered is placed at the bottom of the stack, the next one is put on top of it, then comes the next and so on. Now type DROP and watch the top entry on the stack disappear. Keep on entering DROP until the stack is empty.

Now let's try some simple arithmetic. We'll add two and three and see if we get five. Enter:

```
2
3
+
```

one item at a time – press Return after 2, 3 and +. The two numbers are first placed on the stack, then when the plus is entered they are replaced by the number 5. What plus does is to take the top two numbers off the stack, add them together and replace them with the result.

In Forth's Reverse Polish notation it would be described as:

```
n1,n2 --> n1+n2
```

which means that *n1* the second to top stack item and *n2* the top stack item are replaced by their sum *n1+n2*. Enter DROP until the stack is empty and try another example, again entering each item one at a time and pressing Return:

```
12 4 -
```

The result is that 12 and 4 are first placed on the stack, then when a minus is entered they are taken off and replaced with the result of the sum 12–4. The minus takes the top two items off the stack, subtracts the top from the second to top and places the result back on the stack. In Reverse Polish notation this would be:

```
n1,n2 --> n1-n2
```

You should be getting the hang of it by now, so try a multiplication sum like 5 x 6. First enter the 5, followed by 6 then the multiplication sign. The result – 30 – should be left on the stack. Also try dividing 30 by 3.

Now for something entirely different. The SWAP command swaps the top two numbers on the stack. In Forth notation this would be written as:

```
n1,n2 --> n2,n1
```

See how *n1* and *n2* have been exchanged? Try entering:

```
20 35 SWAP
```

and you should end up with 35 on the bottom of the stack and 20 on top. Now type OVER and the second number, 35, will be copied to the top. You should have three numbers on the stack now. In notation OVER would be written as:

```
n1,n2 --> n1,n2,n1
```

indicating that you start off with two numbers and end up with three – the extra one placed on top being a copy of the original second to top item.

Complex equations are quite simple in Reverse Polish if you go about them in the right way. For instance, how would you work out the answer to:

```
1+5*(3+4)
```

in your head? You would add three to four then multiply the result by five and add 1. In other words, you perform the sum in brackets before the multiplication, which comes before the addition. So, in Reverse Polish this becomes:

```
3 4 + 5 * 1 +
```

You type it in in the same order that you would do the calculation yourself.

You should now have enough information to attempt some of your own calculations, and to experiment with some of the other stack operations. The panel lists the commands and shows the effect on the stack.

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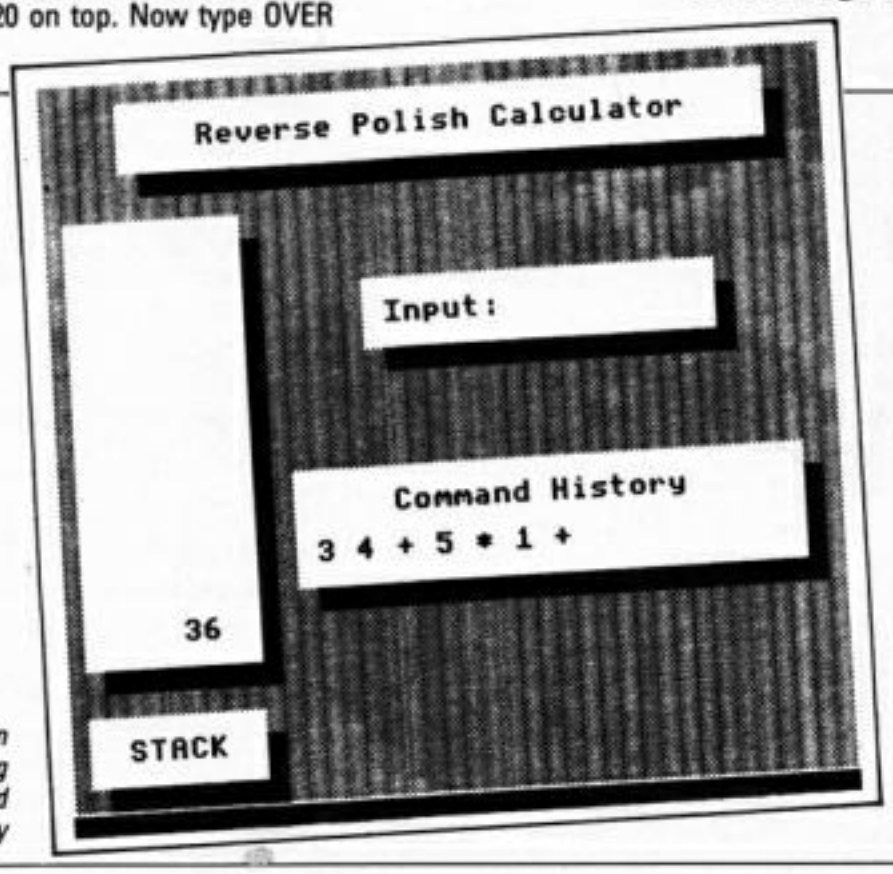

The screen display showing the stack and command history

Command	Function
+	n1,n2 --> n1+n2
–	n1,n2 --> n1-n2
/	n1,n2 --> n1/n2
/MOD	n1,n2 --> remainder,quotient of n1/n2
0<	n --> 1 if n<0 else 0
0=	n --> 1 if n=0 else 0
0>	n --> 1 if n>0 else 0
1+	n --> n+1
1–	n --> n–1
2+	n --> n+2
2–	n --> n–2
<	n1,n2 --> 1 if n1<n2 else 0
=	n1,n2 --> 1 if n1=n2 else 0
>	n1,n2 --> 1 if n1>n2 else 0
?DUP	n --> n,n if n<>0 else n
ABS	n --> ABS(n)
AND	n1,n2 --> n1 AND n2
DROP	n -->
DUP	n --> n,n
MAX	n1,n2 --> MAX(n1,n2)
MIN	n1,n2 --> MIN(n1,n2)
MOD	n1,n2 --> remainder n1/n2
NEGATE	n --> -n
OR	n1,n2 --> n1 OR n2
OVER	n1,n2 --> n1,n2,n1
PICK	n1 --> n2 (Copies n1th item to top)
ROT	n1,n2,n3 --> n2,n3,n1
SWAP	n1,n2 --> n2,n1

The commands and functions understood by the Reverse Polish Calculator

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```
 10 t$="Reverse Polish Calculator"
 20 REM By Julie Boswell
 30 REM (c) Electron User
 40 ON ERROR MODE6:PRINT:REPORT:PRIN
T" at line ";ERL:END
 50 MODE 4:*FX16
 60 PROCinitialise
 70 REPEAT
 80 PROCprint_stack
 90 REPEAT
 100 PROCwindow(16,9,17,2)
 110 INPUT"Input:"c$
 120 IF c$="" line$=""
 130 PROChistory
 140 UNTIL c$>""
 150 PROCcommand
 160 UNTIL FALSE
 170 END
 180
 190 DEF PROChistory
 200 line$=line$+c$+" "
 210 PROCwindow(12,17,25,4)
 220 PRINTTAB(4,0)"Command History"TA
B(0,2)RIGHT$(line$,25);
 230 ENDPROC
 240
 250 DEF PROCcommand
 260 IF c$="*" b%=FNpop:a%=FNpop:a%=a
%*b%:PROCpush:ENDPROC
 270 IF c$="/" b%=FNpop:a%=FNpop:a%=a
%/b%:PROCpush:ENDPROC
 280 IF c$="+" b%=FNpop:a%=FNpop:a%=a
%+b%:PROCpush:ENDPROC
 290 IF c$="-" b%=FNpop:a%=FNpop:a%=a
%-b%:PROCpush:ENDPROC
 300 IF c$="<" b%=FNpop:a%=FNpop:a%=(
a%<b%):PROCpush:ENDPROC
 310 IF c$="=" b%=FNpop:a%=FNpop:a%=(
a%=b%):PROCpush:ENDPROC
 320 IF c$=">" b%=FNpop:a%=FNpop:a%=(
a%>b%):PROCpush:ENDPROC
 330 IF c$="*/" c%=FNpop:b%=FNpop:a%=
FNpop:a%=(a%*b%)/c%:PROCpush:ENDPROC
 340 IF c$="0<" a%=FNpop:a%=(a%<0):PR
OCpush:ENDPROC
 350 IF c$="0=" a%=FNpop:a%=(a%=0):PR
OCpush:ENDPROC
 360 IF c$="0>" a%=FNpop:a%=(a%>0):PR
OCpush:ENDPROC
 370 IF c$="1+" a%=FNpop:a%=a%+1:PROC
push:ENDPROC
 380 IF c$="1-" a%=FNpop:a%=a%-1:PROC
push:ENDPROC
 390 IF c$="2+" a%=FNpop:a%=a%+2:PROC
push:ENDPROC
 400 IF c$="2-" a%=FNpop:a%=a%-2:PROC
push:ENDPROC
 410 IF c$="SWAP" a%=FNpop:b%=FNpop:P
ROCpush:a%=b%:PROCpush:ENDPROC
 420 IF c$="DROP" a%=FNpop:ENDPROC
 430 IF c$="?DUP" a%=FNpop:PROCpush:c
$="DUP":IF a%=0 ENDPROC
 440 IF c$="DUP" a%=FNpop:PROCpush:PR
OCpush:ENDPROC
 450 IF c$="/MOD" c%=FNpop:b%=FNpop:a
%=b% MOD c%:PROCpush:a%=b% DIV c%:PROC
push:ENDPROC
 460 IF c$="ABS" a%=FNpop:a%=ABS(a%):
PROCpush:ENDPROC
 470 IF c$="AND" a%=FNpop:b%=FNpop:a%
=a% AND b%:PROCpush:ENDPROC
 480 IF c$="MAX" b%=FNpop:c%=FNpop:a%
=(b% AND b%>c%)+(c% AND c%>b%):PROCpus
h:ENDPROC
 490 IF c$="MIN" b%=FNpop:c%=FNpop:a%
=(b% AND b%<c%)+(c% AND c%<b%):PROCpus
h:ENDPROC
 500 IF c$="MOD" b%=FNpop:a%=FNpop:a%
=(a% MOD b%):PROCpush:ENDPROC
 510 IF c$="NEGATE" a%=FNpop:a%=-a%:P
ROCpush:ENDPROC
 520 IF c$="OR" a%=FNpop:b%=FNpop:a%=
a% OR b%:PROCpush:ENDPROC
 530 IF c$="OVER" stack%(sp)=stack%(s
p-2):sp=sp+1:ENDPROC
 540 IF c$="PICK" a%=FNpop:a%=stack%(
sp-a%):PROCpush:ENDPROC
 550 IF c$="ROT" b%=FNpop:a%=FNpop:c%
=FNpop:PROCpush:a%=b%:PROCpush:a%=c%:P
ROCpush:ENDPROC
 560 IF c$="XOR" b%=FNpop:a%=FNpop:a%
=a% EOR b%:PROCpush:ENDPROC
 570 a%=VAL c$:PROCpush
 580 ENDPROC
 590
 600 DEF FNpop
 610 IF sp=0 PROCwindow(18,25,13,3):P
RINT"Stack error!";TAB(1,1)"Hit a key"
;:VDU 7:a%=GET:RUN
 620 sp=sp-1:=stack%(sp)
 630
 640 DEF PROCpush
 650 stack%(sp)=a%:sp=sp+1
 660 ENDPROC
 670
 680 DEF PROCprint_stack
 690 PROCwindow(1,6,8,18)
 700 IF sp=0 ENDPROC
 710 FOR i=0 TO sp-1
 720 PRINT TAB(0,16-i);RIGHT$("
"+STR$(stack%(i)),6)
 730 NEXT
 740 ENDPROC
 750
 760 DEF PROCcls
 770 VDU 26
 780 FOR I%=1 TO 5:PRINT STRING$(248,
CHR$224);:NEXT
 790 MOVE 0,28:DRAW 0,1023:DRAW 1278,
1023:DRAW 1278,28:DRAW 0,28
 800 ENDPROC
 810
 820 DEF PROCwindow(X%,Y%,W%,H%)
 830 VDU 28,X%+1,Y%+1+H%,X%+1+W%,Y%+1
:COLOUR 128:CLS
 840 VDU 28,X%,Y%+H%,X%+W%,Y%:COLOUR
129:CLS
 850 VDU 28 X%+1,Y%+H%,X%+W%,Y%+1:COL
OUR 0
 860 ENDPROC
 870
 880 DEF PROCinitialise
 890 VDU 23,224,170,85,170,85,170,85,
170,85
 900 DIM stack%(100)
 910 sp=0
 920 line$="":c$=""
 930 PROCcls
 940 PROCwindow(4,1,32,2)
 950 PRINT TAB(3)t$;
 960 PROCwindow(1,27,8,2):PRINT" STAC
K";
 970 ENDPROC
```

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Adder Sums Age 7-8 yrs.

A sixteen flexible exercise program of games for up to four children are contained on twin cassette or disk programmed for your home computer.

Each child's name is entered at the start and a complete record of results kept. All **ADDER SUMS** games can be set at one of two ability levels with up to any number of tries per child in each.

Right answers bring a Cheshire Cat grinning from the screen, who quickly steps in to help the child in difficulty.

Cheshire Cat **ADDER SUMS** includes:-

Multiplication:	Calculate the cost of items shown in the grocer's shop window.
Addition:	Correctly total the shopping bill from the grocers
Division:	Share out the biscuits using the simple technique provided.
Time:	Learn to tell the time of day, days of the week and the months of the year.
Tables:	Make a start or improve on those important times tables.

Sum Takeaway (Maths Level 2) Age 6-7 yrs.

Nineteen flexible excercise programs of games for up to four children are contained on twin cassettes or disk programmed for your home computer.

Each child's name is entered at the start and a complete record of results kept. All games can be set at two ability levels with with up to 100 games for each exercise.

Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat Sum-Takeaway includes:

Addition:	Full hello to sums.
Subtraction:	Starts with differences and introduces Take Away.
Charts:	Ways of recording information. A vital concept in the child's future.
Tens & Units:	Delightful visual hello to numbers over nine.
Multiply:	First step in those times tables and the 'X' sign.

Sum Measure Age 9-13 yrs.

Six programs with a choice of 6, 10 or 20 questions are contained on twin cassette or disk programmed for your home computer.

Two chances are given to achieve the correct answer, but don't worry extra help is provided for a child in difficulty.

At the end of each run the results are displayed thereby facilitating the monitoring of the child's progress

Cheshire Cat **SUM MEASURE** includes:-

Length:	Work out the length of a line in centimetres or millimetres.
Area:	Find the area of a rectangle using cm^2.
Volume:	Give the volume of a cuboid in cm^2.
Temperature:	Work out the temperature shown on the thermometer.
Mass:	Read the correct balance scale
Capacity:	Measure the amount of liquid in the cylinder.

Sum Times (Maths Level 4) Age 8-9 yrs.

Nineteen flexible exercise programs of games for up to four children are contained on twin cassettes or disk programmed for your home computer. Each child's name is entered at the start and a complete record of results kept. All games can be set at two ability levels with with up to 100 games for each exercise. Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat Sum Times includes:

Tally & Bar Charts:	An easy introduction to graphs.
Time:	A moving clock for digital time.
Tens & Units:	Addition & Subtraction of numbers over nine.
Symmetry:	Lines of symmetry.
Co-ordinates:	Important for reading maps and graphs.
Square Units:	Invaluable for calculating areas etc.

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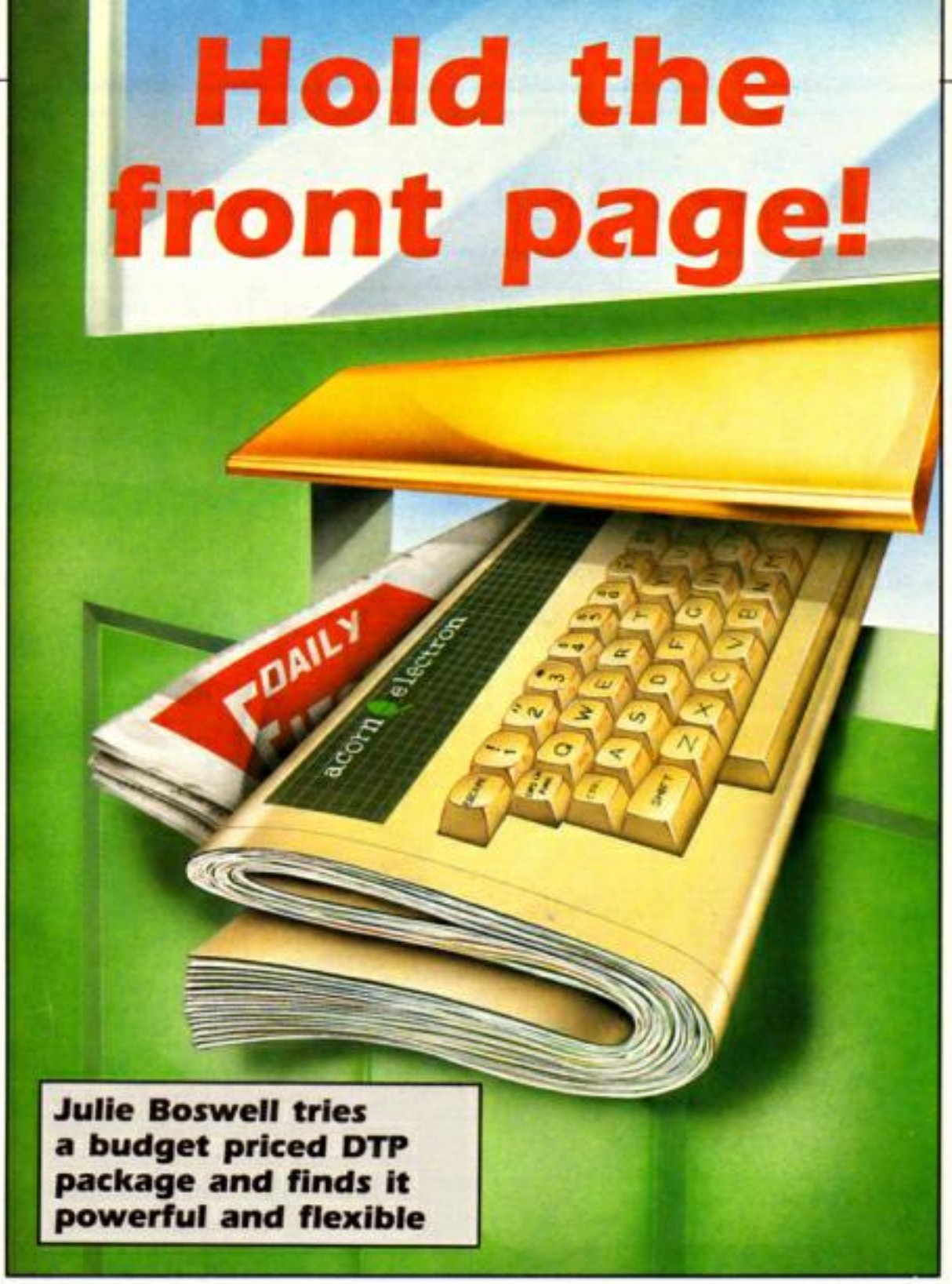


Julie Boswell tries a budget priced DTP package and finds it powerful and flexible

DESKTOP publishing packages have long been associated with powerful micros like the IBM PC and Apple Macintosh – computers costing thousands of pounds. And the software isn't cheap either, running up bills in the hundreds.

While these may be superb systems for the commercial sector, there hasn't been anything available for the enthusiastic amateur on a limited budget who simply wants to create the odd newsletter or club fact sheet.

Pixel Perfect is the first budget-priced desktop publishing package for the Electron. The closest thing so far has been AMX Art, but that is beyond the pocket of many users. At £45 Pixel Perfect is within easy reach of all budding Eddie Shahs.

It is a DTP package of awesome proportions, yet it will fit into any Electron – though a Slogger Turbo helps speed up some of the slower operations. The only restriction is that you must have a disc system – there's an extra charge of £2.20 if you want 3.5in discs rather than 5.25in ones.

When you boot up the Page disc you are presented with a Mode 0 screen containing a menu bar at the top, a panel of icons down the left hand side and along the bottom, and a large blank window. When you create a page this window shows a small section of it, and you can scroll it in any direction to examine the rest.

The icons – selected using the cursor keys – enable you to scroll the window, print a page, display it on the screen, fill shapes in a variety of patterns, draw with a pen, invert areas of the page, draw circles, erase or wipe out mistakes, rubberband lines, enter text, cut and paste, spray, box in or mirror areas, twist, expand and magnify and so on. The list of functions seems almost endless.

The first task after booting up the software is to create a new A4 page. This operation can take over two minutes, and requires a whole blank disc's worth of space. Next the headline for the first story can be entered. You can specify the width and height of the characters, or choose the pre-defined headline size – this last option is the quickest.

After selecting the font from Roman, Sanserif or Gothic the cursor is moved with pixel accuracy to the correct position, and text is entered by typing away at the keyboard. Unfortunately, the disc is accessed with every keypress, making this a painfully slow process, Thankfully headlines are usually very short.

You can't easily delete letters which can cause a few headaches, and frequently I wiped out the lot and started again as it was quicker this way.

Then it's on to the text itself. Both the size and the font can be chosen at the start. A rubberbanded box is placed on the page to show where the text is to be printed and after setting this you enter the text editor. The term text editor is probably an overstatement as it is a very primitive system. You enter a line at a time at the bottom of the screen and this is pasted on to the page when you press Return.

The only editing command you've got is the Delete key which erases the last character in the input line. It's difficult to make major changes once the text is pasted on the page. I found the lack of a cursor a hinderance as it's difficult to tell where you are. The text can be justified, centered or set with a ragged left or right edge. The alternative method of text entry is to import a View file, an option which considerably eases the operation.

Text entered, you can create any illustrations required using the impressive array of drawing functions. I'm not much of an artist, so I usually cheat and grab pre-drawn banners, pictures and icons off AVP's Artpack clipart disc.

On selecting this option a box is drawn on screen indicating the size of the artwork, and you place it in position on the page. The image is then loaded and pasted in place.

This process is repeated for each item – text or graphics – to be placed on the page. You can save your work at any point and continue at a later date. After safely storing your work on disc you can print it out in either draft or NLQ mode. The speed of this operation depends on your printer and the mode selected, and can take up to 10 minutes. You may have problems if your printer isn't Epson compatible.

The Master disc provides you with a facility to view your page on screen. Of course, it's impossible to see a whole A4 page, so it is compressed and reduced in size to fit in half a screen – the other half can be used to show another page. Unfortunately, this means you can't read the text, but you can get a good idea of what the layout is like.

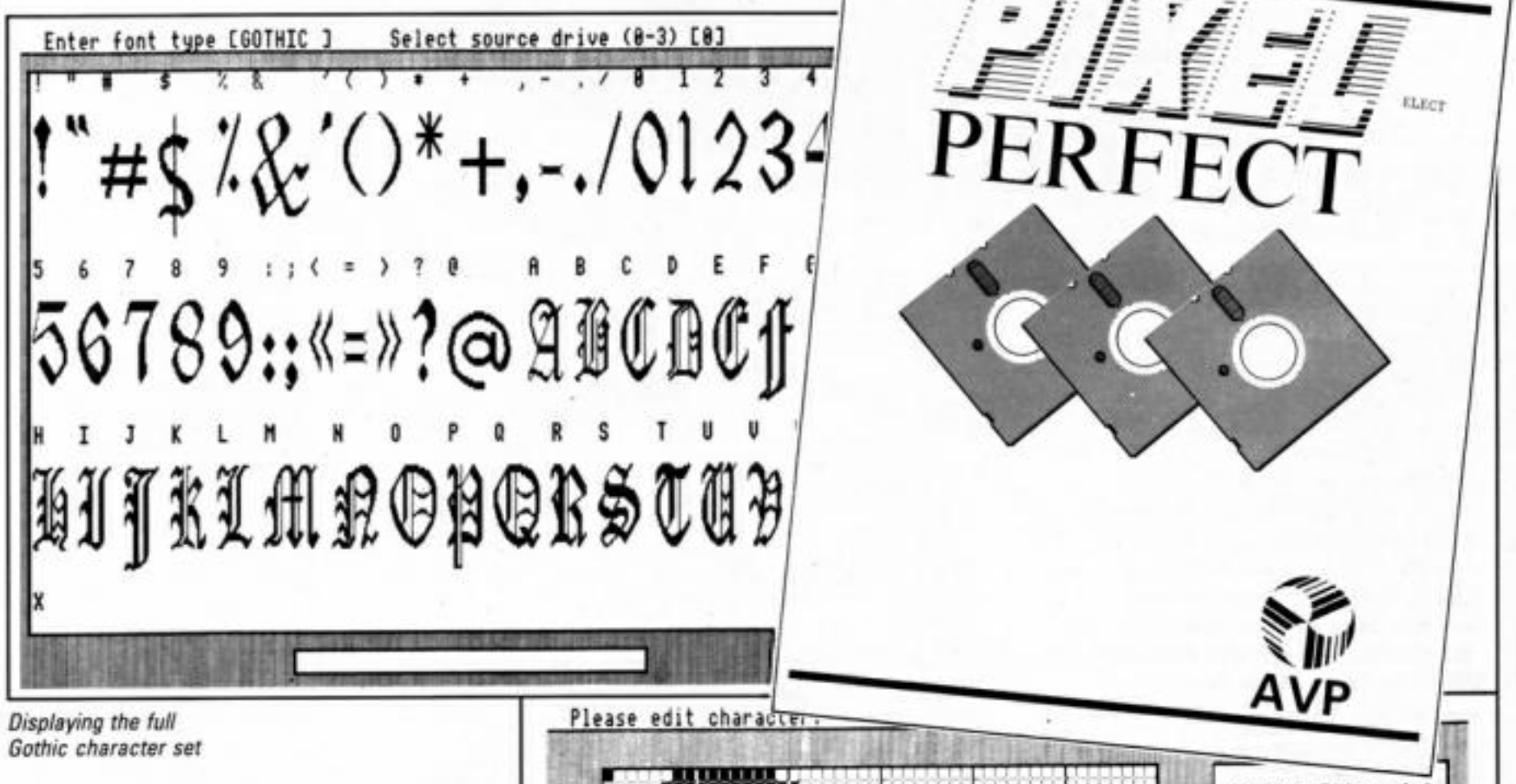
The only fault is that you can't do this from within the page creator and editor – you have to leave this and boot up the Master disc. It makes modifying the layout a pain in the neck, as there is much chopping and changing of discs and programs.

A font editor is provided so you can create your own typefaces, or modify the three fonts supplied. The major part of the screen is taken up by a large editing window in which the character is displayed in magnified form. A grid can be overlaid on to this making it easier to judge the size and shape.

You move around with the cursor keys and points are set with the Return key. You can invert the whole character with I, and areas can be filled and you can scroll the character round the edit window. When you've finished your design can be saved. The whole font can be displayed on screen at once.

Conclusions

The graphics capabilities of Pixel Perfect are excellent. The facilities are easy to use and a vast array of effects can be achieved. The clipart Artpack is available separately and



Displaying the full Gothic character set

contains many icons, borders and useful maps, as well as some less useful graphics such as a smouldering cigarette.

Pictures can be cut and pasted, magnified and altered, as well as reflected, twisted, inverted, enlarged and manipulated as much as you want. There is a facility to create your own artwork, but this is rather basic.

A more useful and exciting facility is the easy import of whole screens created – in any screen mode – using other packages. The conversion to Mode 0 and grey shading is faultless, and shades may be inverted.

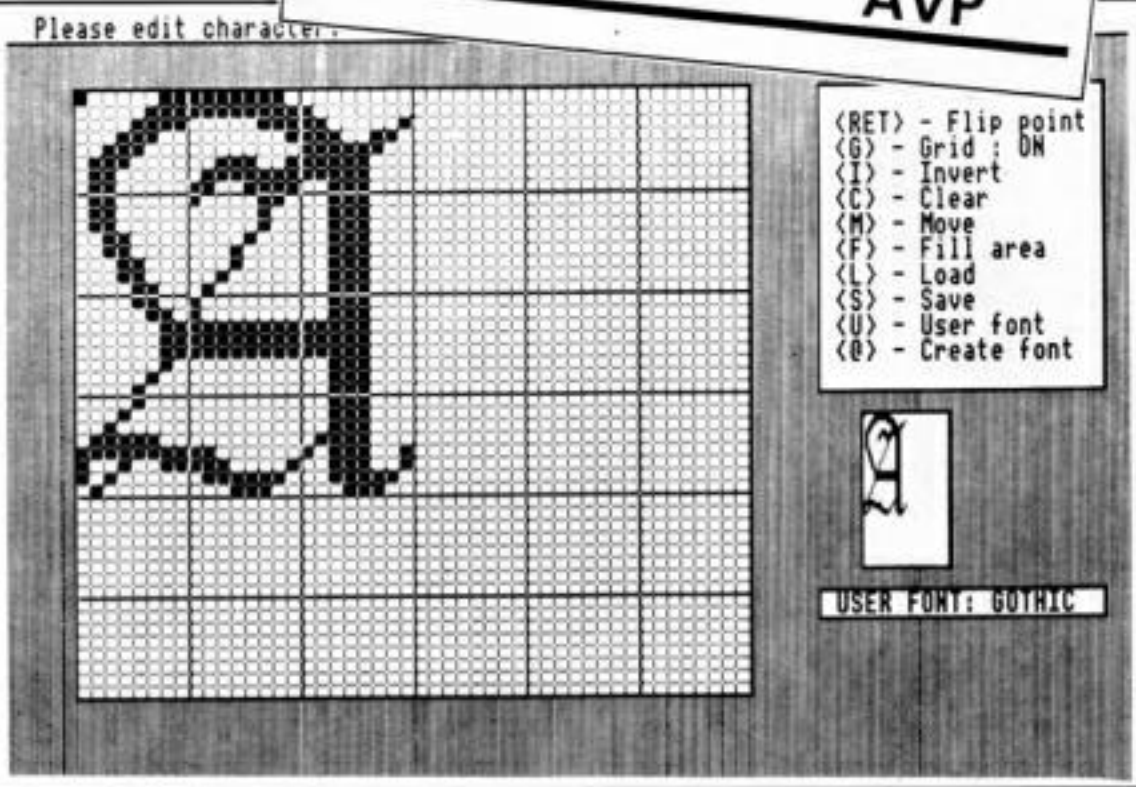
Here is a DTP package that does what you want, but there are disadvantages. The main one is the disc swapping. I used twin drives so the situation wasn't too bad, but single drive owners may soon find themselves frustrated. The situation could be improved if the discs were not protected as it would allow you to set up a double drive with most of what you wanted immediately accessible.

Making simple changes to the page is often complex and may involve the slow major exercise of re-composing the page. You can overcome this by importing text from other packages, but this would diminish the free wheeling "hold the front page" activities that DTP can promote.

Other annoying features exist, such as the need for regular saving – scroll an unsaved section of a page and you will lose it.

If you want a comprehensive DTP package and have a fairly long lead time for your newsletters, magazines and so on, Pixel Perfect could be the answer – especially with its low entry price. Programmers take note that utilities are provided to use the fonts and graphics to jazz up your own programs.

Product: Pixel Perfect
Price: £45.43
Supplier: AVP, School Hill Centre, Chepstow, Gwent NP6 5PH.
Tel: 02912 5439



Editing the Gothic character set

The page editor screen showing the editing window and icon-driven toolkit

10

LINERS

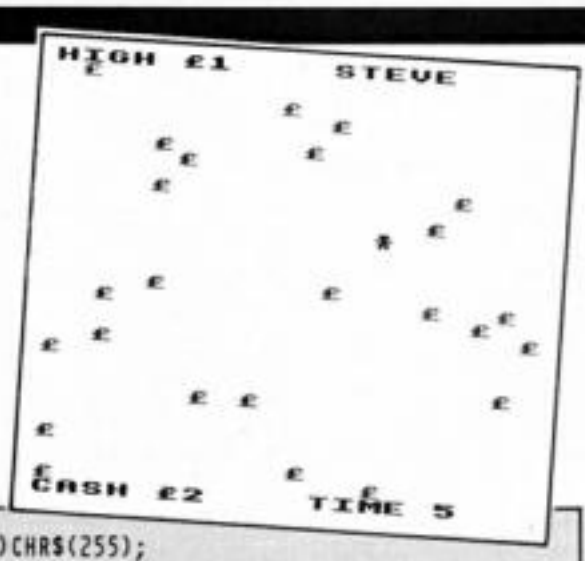
ESCALATOR TRAIL

HERE is an interesting effect by Steve Bissell involving palette switching. Solid blocks of overlapping colours are drawn on the screen in a continuous diagonal movement, the direction changing each time the edge of the screen is reached.

Watch how the trail created by the blocks appears to flow around the screen using a palette switching technique. Hitting the spacebar will clear the screen, starting the trail from a new position.

```
   10 REM Escalator Trail
   20 REM By Steve Bissell
   30 MODE 2:DIM P%(7):VDU 23,1,0;0;0;
0;0;:XDIR%=16:YDIR%=16:X%=RND(37)*32:Y
%=RND(28)*32+32:C%=1:FOR I%=1 TO 7:P%(
I%)=I%-1:NEXT:A%=1:B%=1:COLOUR 136:COL
OUR 9:VDU 19,8,1;0;19,9,3;0;0;:PRINT"S
PACE-BAR to Restart"
   40 VDU &FF17;&FFFF;&FFFF;&FFFF;&FFF
F;5;:*FX16
   50 REPEATX%=X%+XDIR%DIVA%:Y%=Y%+YDI
R%DIVB%:C%=(C%+1)MOD7:GCOL0,C%+1:MOVEX
%,Y%:VDU255:IFX%=0ORX%=1216XDIR%=-XDIR
%:A%=RND(2)
   60 IFY%=32ORY%=960YDIR%=-YDIR%:B%=R
ND(2)
   70 FORI%=1TO7:P%(I%)=(P%(I%)+1)MOD7
:VDU19,I%,1+P%(I%);0;:NEXT:UNTILINKEY0
=32:RUN
```

Loadsa Money

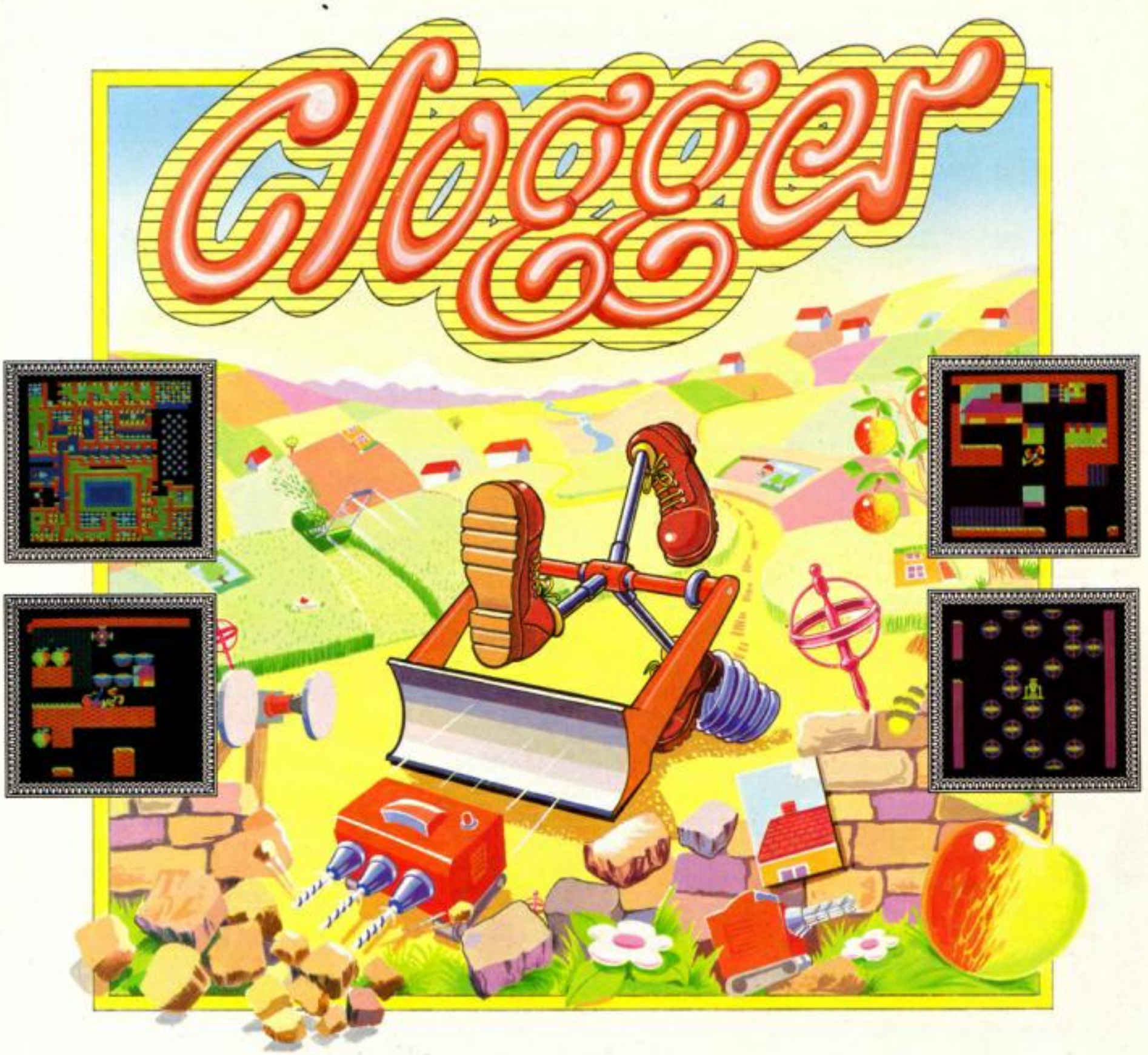


HAVE you ever dreamed of finding money simply lying around, just waiting for you to pick it up? Well here is your chance, with this frustrating little game by Steve Bissell. Money keeps popping up all over the place, and all you have to do is pick it up. Well almost – there is a time limit so you'll have to be quick.

The current high score and name are displayed on screen. The controls are:

Z	= Left	:	= Up
X	= Right	/	= Down

```
   10REM Load'sa Money
   20REM By Steve Bissell
   30 MODE 5:DIM S%(19,30):VDU 23,1,0;
0;0;0;23,255,56,56,16,124,16,56,40,40:
HI%=1:N$="STEVE":*FX16
   40REPEAT:CLS:X%=10:Y%=15:SC%=0:COLO
UR 2:PRINT"HIGH £"TAB(11,0)N$TAB(0,31)
"CASH £"TAB(11,31)"TIME";:TIME=0:REPEA
T:T%=TIME/100:PP%=RND(10):IF PP%>8 PX%
=RND(20)-1:PY%=(RND(30)+1)-1:COLOUR 1:
PRINTTAB(PX%,PY%)"£";:S%(PX%,PY%)=96
   50COLOUR 0:PRINTTAB(X%,Y%)" ";:X%=X
%+(INKEY-98 AND X%>0)-(INKEY-67 AND X%
<19):Y%=Y%+(INKEY-73 AND Y%>1)-(INKEY-
105 AND Y%<30):COLOUR 3:PRINTTAB(X%,Y%
)CHR$(255);
   60IF S%(X%,Y%)=96 SC%=SC%+1:S%(X%,Y
%)=0:SOUND 1,-15,250,2
   70COLOUR 3:PRINTTAB(6,0);HI%TAB(6,3
1);SC%TAB(16,31);10-T%" ";:UNTIL T%=10
:SOUND 2,-15,15,20:FOR E%=0 TO 19:FOR
E1%=0 TO 30:S%(E%,E1%)=0:NEXT:NEXT:CLS
:COLOUR 2:PRINTTAB(1,8)"You Collected
£";SC%:*FX21
   80IF SC%>HI% HI%=SC%:COLOUR 1:PRINT
TAB(1,13)"A new  HIGH SCORE":COLOUR 3:
INPUTTAB(0,17)"Enter Name (max. 8)""
'N$
   90COLOUR 3:PRINTTAB(0,17)" Play Aga
in? (Y/N) ":K$=GET$:UNTIL K$<>"Y":CLS
```



CLOGGER - The State of The Art

In a strange and mystical land, many years ago, lived a peaceful race of beings known as the Cloggers. Cloggers were unusual creatures with 3 feet and no head but with strange powers that enable them to perceive their environment in a way that is incomprehensible to man.

Cloggers also have a great love of art and in order to achieve the status of Master Clogger must prove their artistic appreciation. To do this all young Cloggers must undertake a series of cunningly conceived tests. These consist of reassembling various pieces of artwork which are scattered around dangerous landscapes in the hidden valleys of Clogland.

Few Cloggers ever reach the status of Master Clogger. The task is truly awesome with countless problems to be solved and pitfalls to overcome. The time taken to complete each landscape is also critical but the powers that be have kindly left a little extra food. However this should be eaten with moderation as guzzling it down can lose some of its energy value.

Each of the 18 landscapes becomes progressively more complex with increasing numbers of individual tests of initiative.

There are drills to be found which can be used (sparingly!) to create essential passageways; powerful lawnmowers to clear the deadly Cloggrass; plus springs, rebounding gyroscopes and buffers which all hinder your progress.

One ill-considered action can render your whole future worthless.

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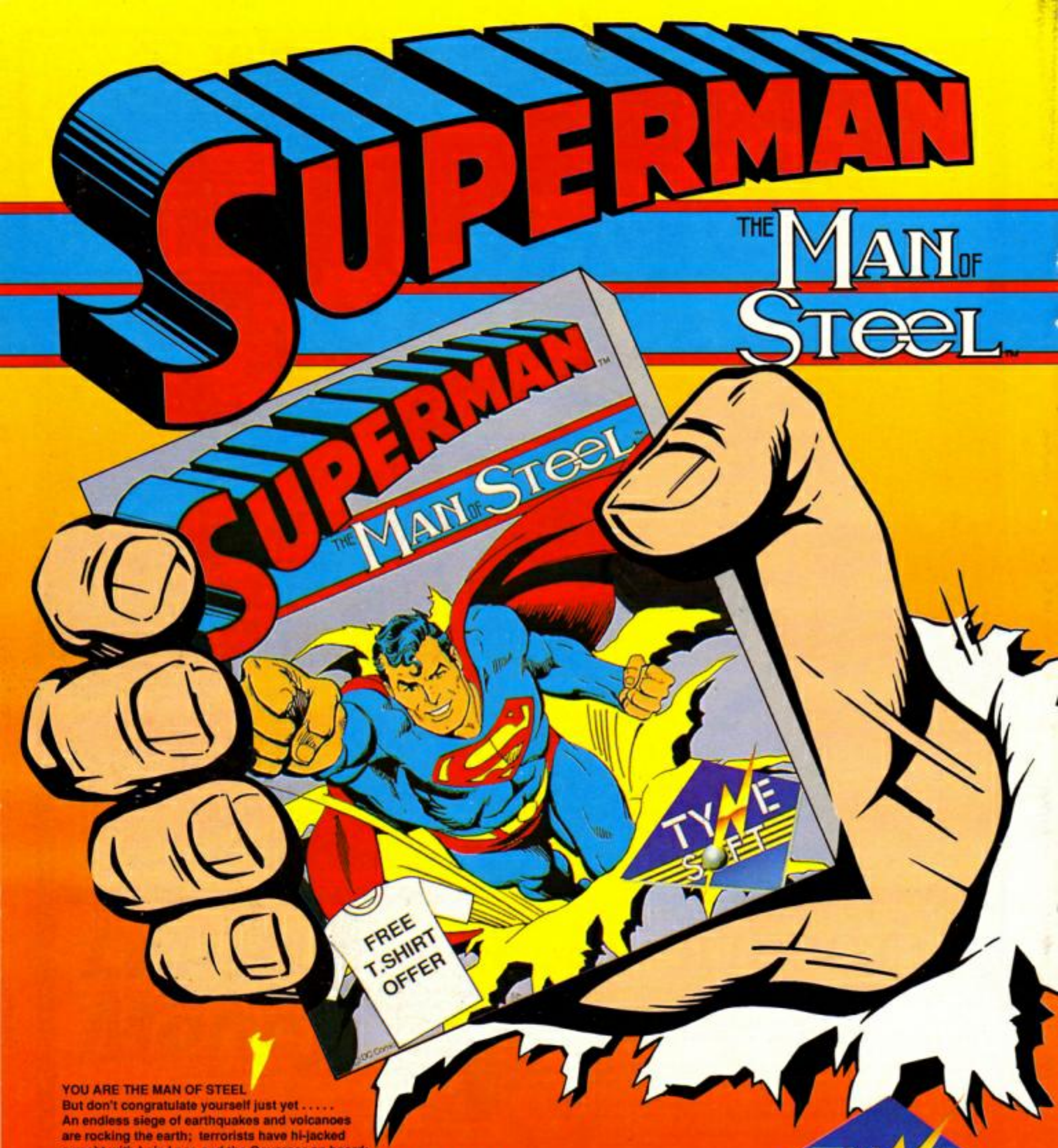

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Acorn Eater

IMAGINE a hybrid made by combining the best features of the old snake or caterpillar type game and Repton and you have one of the most exciting new arcade action thrillers around. Fast reactions and a keen eye are called for if you are to survive for long.

Slippery Sam is a snake with an enormous appetite for acorns and eggs. You guide him round a maze gobbling up any eggs you come across. Each one adds to the length of your tail. You must avoid running into the walls and be careful not to bite your own ever-growing tail.

As you approach the edge of the screen it will scroll smoothly up, down, left or right depending on your direction. The maze is several times larger than the screen, so there's plenty of exploring to do.

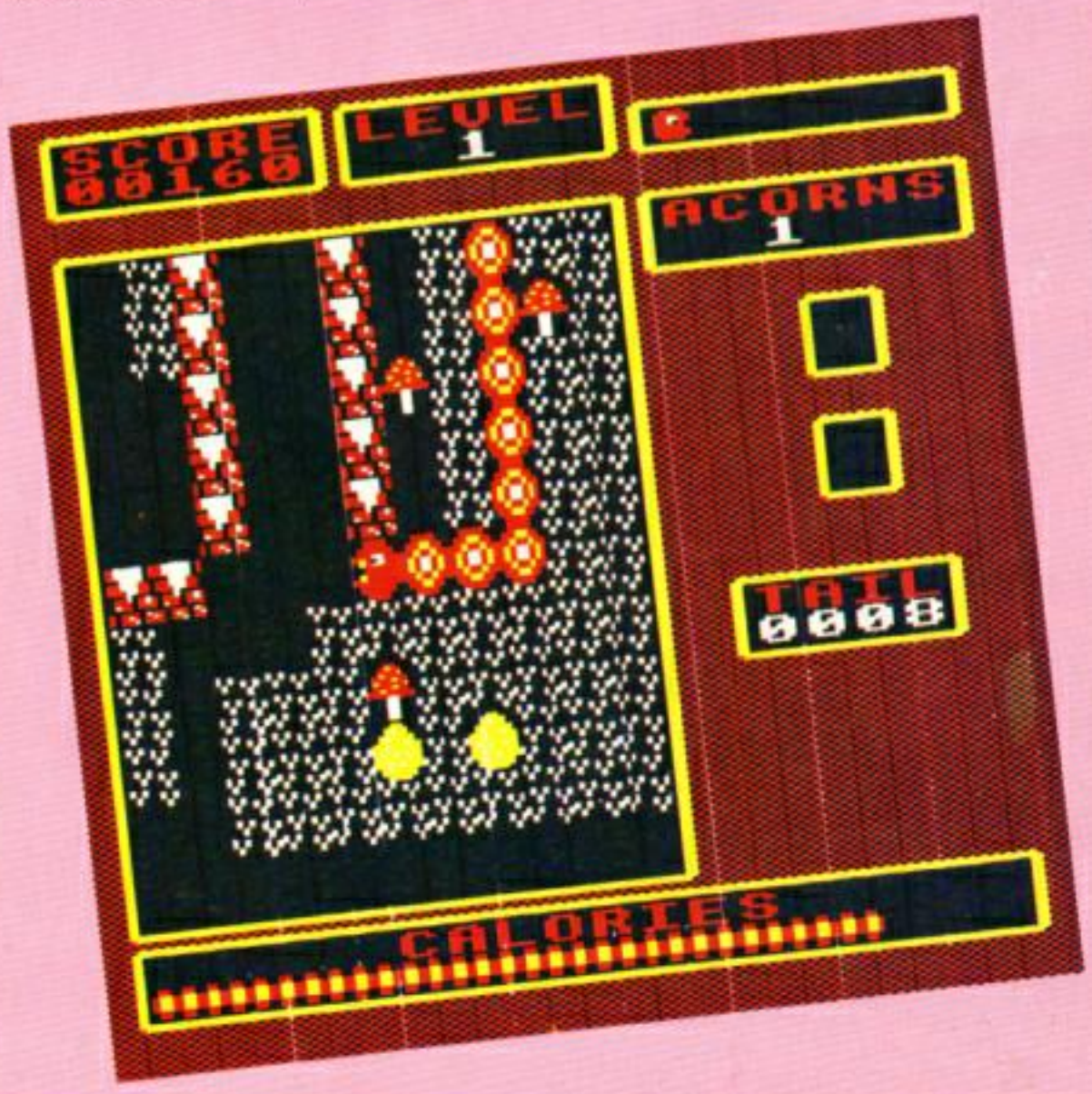
If you don't eat enough eggs you will starve and the amount of energy you have got will dwindle – this is shown by the calorie bar at the bottom of the screen. Toadstools are poisonous and drastically reduce your energy – shown be a reduction in your calories and length of tail – so avoid them at all costs.

Guide Slippery Sam round the garden as he eats all the acorns in Anthony Houghton's fast-paced arcade game

However, if your tail becomes so long that you are in danger of bumping into it, by all means reduce it slightly with a toadstool or two – but don't overdo it

Every now and then an acorn will appear somewhere in the maze heralded by a sound, and you must find this quickly before it goes mouldy. Leave it too long and the mould will spread throughout the maze. Avoid this poisonous fungus.

When you have collected all the acorns you'll be given a bonus which depends on the length of your tail – the longer it is the more points you'll get. You then move on to the next screen, and there are six to master in all.




```
  10REM Slippery Sam
  20REM by A.Houghton
  30REM (c) Electron User
  40ENVELOPE1,1,50,-50,5,4,4,20,126,0
,0,-126,126,126:ENVELOPE2,1,-50,50,-5,
4,4,20,126,0,0,-126,126,126:ENVELOPE3,
1,20,-20,1,5,5,100,126,0,0,-126,126,12
6:ENVELOPE4,1,-20,20,-1,5,5,100,126,0,
0,-126,126,126
  50*FX16
  60IFPAGE<&1200GOTO110
  70*K.0*T.IMDEL.10,90IMFORI%=0TO(TOP
-PA.)S.4:I%!&E00=I%!PA.:N.IMPA.=&E00IM
0.IMRUNIFIM
  80VDU21:*FX21
  90*FX138,0,128
  100END
  110PROCinit:REPEAT:MODE5:VDU23;8202;
0;0;0;19,1,4;0;19,3,2;0;17,2:PRINTTAB(
4,4)"SLIPPERY SAM":COLOUR1:PRINTTAB(3,
7)"by A. Houghton":*FX21
  120COLOUR3:PRINTTAB(0,20)"Press SPAC
E to play":REPEATUNTILGET=32
  130lives=3:?score=0:score?1=0:level=
1:?acorns=1:PROCscreen:REPEAT:PROCmaze
:CALLmain:IF?dead=&E0 PROCbonus ELSEPR
OCdead
  140UNTILlives=0:PROCd(100):PROCwindo
w(4,16,7,15):COLOUR3:PRINTTAB(4,15)"GA
ME"TAB(4,16)"OVER":PROCd(200):UNTILFAL
SE
  150DEFPROCdead:lives=lives-1:!dat=&A
00:FORN%=150TO100STEP-10:SOUND1,4,N%,5
:?scr=&20:scr?1=&6B:IF!dat>&A60 !dat=&
A00
  160CALLprint:PROCd(25):NEXT:ENDPROC
  170DEFPROCbonus:PROCd(20):FORN%=100T
O200STEP10:SOUND1,1,N%,3:NEXT:REPEAT:S
OUND&10,0,0,0:CALLdeccals:CALLinsc:CAL
Lpsc:SOUND0,-15,4,1:PROCd(2):UNTIL?dea
d=&7C
  180IF?vist>0REPEAT:SOUND&10,0,0,0:CA
LLdvist:CALLinsc:CALLpsc:SOUND0,-15,4,
1:PROCd(2):UNTIL?vist=0ANDvist?1=0
  190FORN%=1TO5*level:SOUND&10,0,0,0:C
ALLinsc:CALLpsc:SOUND0,-15,4,1:PROCd(2
):NEXT:level=level+1:IFlives<7 lives=l
ives+1
  200?acorns=(level+1)DIV2:IF?acorns>9
 ?acorns=9:ENDPROC ELSEENDPROC
  210DEFPROCd(D%):TIME=0:REPEATUNTILTI
ME>D%:ENDPROC
  220DEFPROCmaze:sheet=(level-1)MOD6:R
ESTORE(380+10*sheet):FORN%=0TO63STEP8:
READA$:FORM%=0TO7:M%?(mazdat+N%)=EVAL(
"&"+MID$(A$,M%+1,1)):NEXT,
  230CALLmazgen:FORN%=1TO20+level
  240A%=RND(1024)-1:IFA%?maze=0ORA%?ma
ze=&20 A%?maze=&60 ELSEGOTO240
  250A%=RND(1024)-1:IFA%?maze=0ORA%?ma
ze=&20 A%?maze=&80 ELSEGOTO250
  260NEXT:PRINTTAB(13,2)SPC6TAB(1,29)S
PC18:VDU31,16,9,31,8,10,32,31,16,13,32
```

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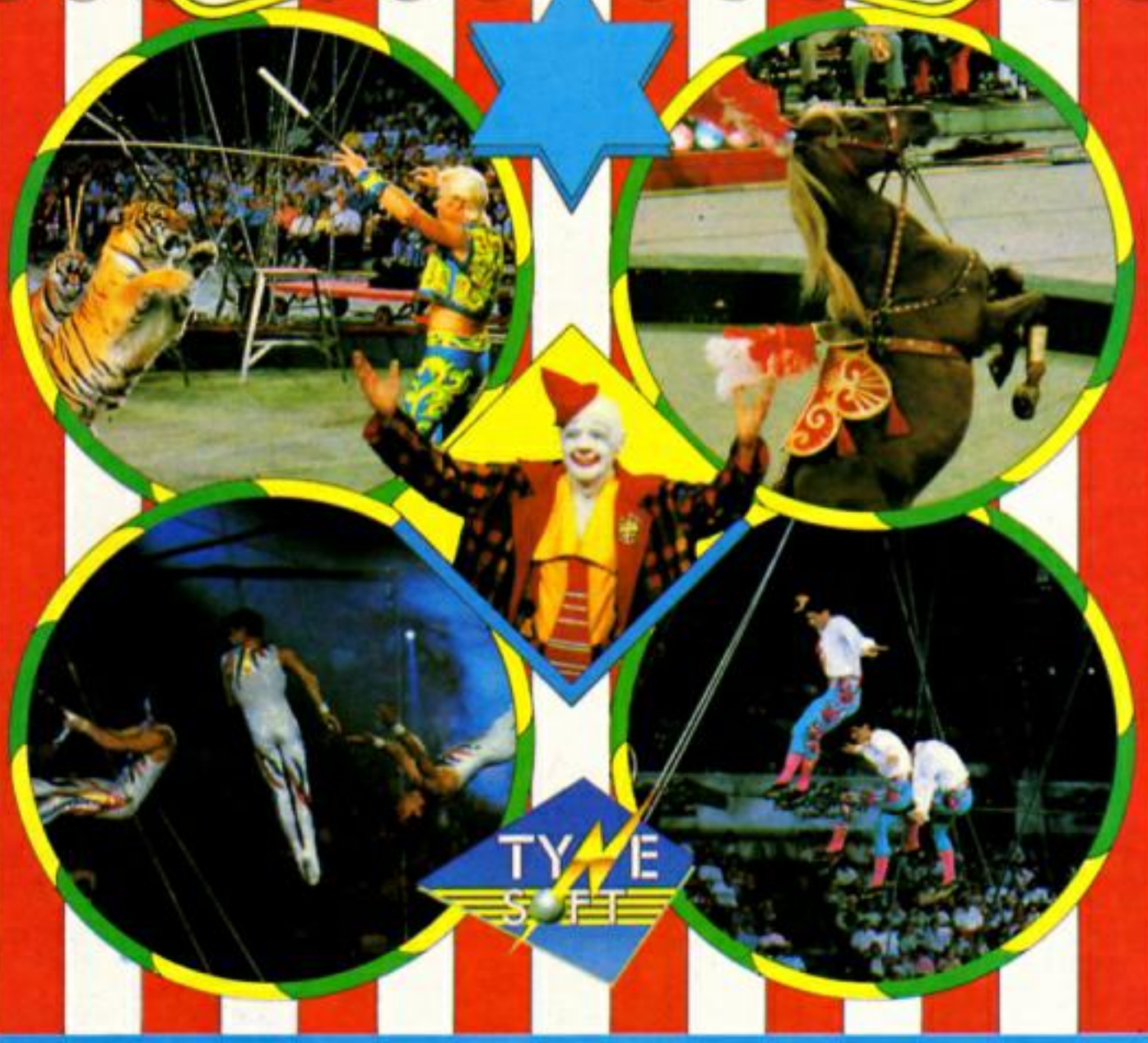

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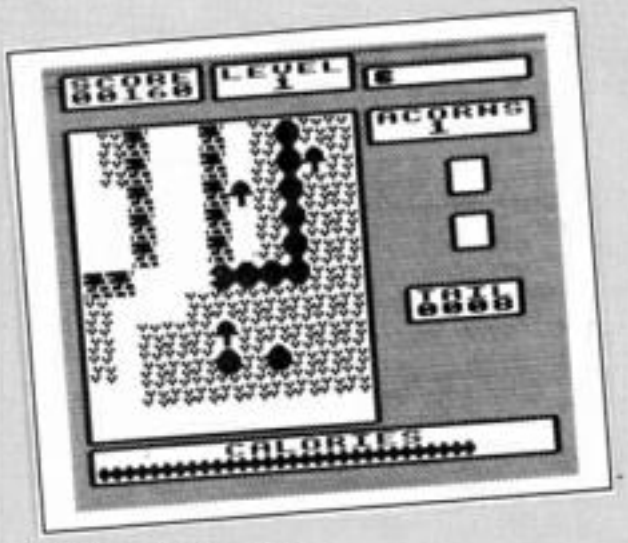

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```
,8,10,32
 270?samx=14:?samy=13:?hdpt=2:?tailpt
=0:!tail=maze+&1AE:?tlen=0:?vist=0:vis
t?1=0:?dead=0:IFsheet=4 ?samdir=&40 EL
SE?samdir=&20
 280CALLwindow:!cals=&7C48:?caltm=15:
FORN%=1TO30:CALLinccals:NEXT:?accon=15
0-10*level:IF?accon<50 ?accon=50
 290?actim=?accon:?acflag=0:COLOUR3:P
RINTTAB(15,6);?acorns:CALLpvist:?mocon
=15-level DIV2:IF?mocon<1 ?mocon=1:?mo
tim=?mocon
 300CALLpsc:COLOUR3:PRINTTAB(9,2);lev
el:IFlives>1FORN%=1TOlives-1:!scr=&5B4
0+16*N%:!dat=&A90:CALLlivp:NEXT
 310ENDPROC
 320DEFPROCscreen:CLS:CALLdither:PROC
window(1,2,5,1):PROCwindow(7,2,11,1):P
ROCwindow(13,2,18,2):PROCwindow(13,6,1
8,5):PROCwindow(16,10,16,9):PROCwindow
(16,14,16,13)
 330PROCwindow(1,26,11,5):PROCwindow(
1,29,18,28):PROCwindow(14,19,17,18):CO
LOUR1:PRINTTAB(1,1)"SCORE"TAB(7,1)"LEV
EL"TAB(13,5)"ACORNS"TAB(6,28)"CALORIES
"TAB(14,18)"TAIL":ENDPROC
 340DEFPROCwindow(l%,b%,r%,t%):le%=(l
%-1)*64:bo%=(31-b%)*32-1:ri%=(r%+1)*64
:to%=(33-t%)*32-1
 350VDU5:GCOL0,2:MOVEle%,to%:VDU224:F
ORN%=le%+64TOri%-64STEP64:VDU225:NEXT:
VDU226:FORN%=to%-32TObo%+32STEP-32:MOV
Ele%,N%:VDU227:MOVEri%,N%:VDU228:NEXT
 360MOVEle%,bo%:VDU229:FORN%=le%+64TO
ri%-64STEP64:VDU230:NEXT:VDU231:VDU24,
le%+56;bo%;ri%;to%-28;18;128,16,26,4:E
NDPROC
 370REM Maze Data
 380DATA11000011,110800B1,00051000,08
676921,0015F521,000C6D21,1A011111,1103
3300
 390DATA00000069,06669005,0866D005,0C
666905,00866D05,50C66905,50000005,C666
666D
 400DATAF0002030,08691903,01050530,08
676D03,05050130,0C1C6D03,0030F0F0,F00F
0F0E
 410DATA00000000,00000000,00000000,00
000000,00000000,00000000,00000000,0000
0000
 420DATA76666669,76666695,76666955,76
669555,76695555,76955555,79555555,7777
7777
 430DATA00066600,25000000,27676705,25
050505,27676705,25050500,27676760,B333
3330
 440DEFFNhinib(U$):B%=EVAL("&"+U$):=(
B%DIV4)AND3
 450DEFFNlonib(U$):B%=EVAL("&"+U$):=B
%AND3
 460DEFPROCinit:IFINKEY-256=1timer=&2
9F ELSEtimer=&2A0
 470VDU23,224,0,0,0,0,0,3,7,6,23,225,
0,0,0,0,0,255,255,0,23,226,0,0,0,0,0,1
92,224,96,23,227,6,6,6,6,6,6,6,6,23,22
8,96,96,96,96,96,96,96,96
 480VDU23,229,6,7,3,0,0,0,0,0,23,230,
0,255,255,0,0,0,0,0,23,231,96,224,192,
0,0,0,0,0
 490RESTORE1310:FORN%=&900TO&A9FSTEP4
:READA$:!N%=EVAL("&"+A$):NEXT:DIMtokda
t 256
 500RESTORE1260:FORN%=0TO255STEP16:RE
ADA$:FORM%=0TO15STEP2:U$=MID$(A$,M%DIV
2+1,1):tokdat?(N%+M%)=FNhinib(U$):tokd
at?(N%+M%+1)=FNlonib(U$):NEXT,
 510scr=&70:dat=&72:cal=&74:mazpt=cal
:cals=&7E:DIMQ%2000,maze 1030,shadow 1
030,mazdat 64,tail 256:FORP=0TO2STEP2:
P%=Q%:[OPTP
 520.gul1 EQUW&11:EQUW1:EQUW70:EQUW5:
.gul2 EQUW&11:EQUW1:EQUW30:EQUW8:.muso
 EQUW&11:EQUW2:EQUW100:EQUW7
 530.acso EQUW2:EQUW3:EQUW50:EQUW10:.
moso EQUW2:EQUW4:EQUW100:EQUW10
 540.dither LDA#0:STAscr:LDA#&58:STAs
cr+1:LDY#0:.dilp LDA#5:STA(scr),Y:INY:
LDA#10:STA(scr),Y:DEY
 550LDAscr:CLC:ADC#2:STAscr:LDAscr+1:
ADC#0:STAscr+1:BPLdilp:RTS
 560.print LDX#2:.prlp1 LDY#15:.prlp2
 LDA(dat),Y:STA(scr),Y:DEY:BPLprlp2
```

CONTROLS

Z	Left
X	Right
*	Up
?	Down

```
 570LDAscr:CLC:ADC#&40:STAscr:LDAscr+
1:ADC#1:STAscr+1:LDAdat:CLC:ADC#16:STA
dat:DEX:BNEprlp1:RTS
 580.livp LDY#15:.lvpl LDA(dat),Y:STA
(scr),Y:DEY:BPLlvpl:RTS
 590.calc LDA#0:STAcal+1:TYA:LDY#5:.r
olp ASLA:ROLcal+1:DEY:BNErolp:STAcal:T
XA:CLC:ADCcal:STAcal:LDAcal+1:ADC#0:ST
Acal+1:LDAcal:CLC:ADC#maze MOD256:STAc
al:LDAcal+1:ADC#maze DIV256:STAcal+1:R
TS
 600.window LDA#19:JSR&FFF4:LDAsamx:S
EC:SBC#5:STAmazex:LDA#&50:STAwindad:LD
A#&5E:STAwindad+1
 610LDA#11:STAwncnx:.winxlp LDA#11:ST
Awncny:LDAwindad:STAscr:LDAwindad+1:ST
Ascr+1:LDAsamy:SEC:SBC#5:STAmazey
 620.winylp LDA#9:STAdat+1:LDAmazex:C
MP#32:BCCchkylm:.block LDA#&40:STAdat:
JSRprint:JMPnxtblk
 630.chkylm LDAmazey:CMP#32:BCCchksam
:JMPblock:.chksam LDAwncnx:CMP#6:BNEpr
wom:LDAwncny:CMP#6:BNEprwom:LDAsamdir:
STAdat:LDA#&A:STAdat+1:JSRprint:JMPnxt
blk
 640.prwom LDXmazex:LDYmazey:JSRcalc:
LDY#0:LDA(cal),Y:STAdat:JSRprint
 650.nxtblk INCmazey:DECwncny:BNEwinY
lp:LDAwindad:CLC:ADC#16:STAwindad:LDAw
indad+1:ADC#0:STAwindad+1:INCmazex:DEC
wncnx:BNEwinXlp:RTS:.winYlp JMPwinylp:
.winXlp JMPwinxlp
 660.mazex EQUB0:.mazey EQUB0:.wncnx
EQUB0:.wncny EQUB0:.windad EQUW0
 670.samx EQUB0:.samy EQUB0:.samdir E
QUB0:.dead EQUB0
 680.mvsam LDXsamx:LDYsamy:JSRcalc:LD
Y#0:LDA#&C0:STA(cal),Y
 690LDA#&81:LDX#&9E:LDY#&FF:JSR&FFF4:
TYA:BEQntlft:LDA#0:STAsamdir:JMPmove
 700.ntlft LDA#&81:LDX#&BD:LDY#&FF:JS
R&FFF4:TYA:BEQntrt:LDA#&20:STAsamdir:J
MPmove
 710.ntrt LDA#&81:LDX#&B7:LDY#&FF:JSR
&FFF4:TYA:BEQntup:LDA#&40:STAsamdir:JM
Pmove
 720.ntup LDA#&81:LDX#&97:LDY#&FF:JSR
&FFF4:TYA:BEQmove:LDA#&60:STAsamdir
 730.move LDAsamdir:BNEntl:DECsamx:JM
Pchk:.ntl CMP#&20:BNEntr:INCsamx:JMPch
k:.ntr CMP#&40:BNEntu:DECsamy:JMPchk:.
ntu INCsamy
 740.chk LDAsamx:CMP#32:BCShit:LDAsam
y:CMP#32:BCShit
 750LDXsamx:LDYsamy:JSRcalc:LDXhdpt:L
DAcal:STAtail,X:LDAcal+1:STAtail+1,X:I
NX:INX:STXhdpt
 760LDY#0:LDA(cal),Y:CMP#&C0:BEQhit:C
MP#&40:BEQhit:CMP#&A0:BEQhit:CMP#&E0:B
EQgtacn
 770CMP#&80:BEQmush:CMP#&60:BNEdeltai
l:JSRinsc:JSRpsc:JSRinccals:LDAtlen:CM
P#254:BCSdeltail:INCtlen:LDX#gul1 MOD2
56:LDY#gul1 DIV256:LDA#7:JSR&FFF1:JMPi
vist
 780.mush LDX#muso MOD256:LDY#muso DI
V256:LDA#7:JSR&FFF1:JSRdeccals:LDAtlen
:BEQdeltail:DECtlen:JSRdeltail:JSRdelt
ail:JMPdvist
 790.hit LDA#&FF:STAdead:RTS
 800.hdpt EQUB0:.tailpt EQUB0:.deltai
l LDXtailpt:LDAtail,X:STA&90:LDAtail+1
,X:STA&91:LDA#0:TAY:STA(&90),Y:INX:INX
:STXtailpt:RTS
 810.gtacn JSRinsc:JSRinsc:DECacorns:
LDA#31:JSR&FFEE:LDA#15:JSR&FFEE:LDA#6:
JSR&FFEE:LDA#17:JSR&FFEE:LDA#3:JSR&FFE
E:LDAacorns:CLC:ADC#48:JSR&FFEE
 820LDA#0:STAacflag:LDAaccon:STAactim
:LDA#&40:STAscr:LDA#&64:STAscr+1:LDA#0
:STAdat:LDA#9:STAdat+1:JSRprint
 830LDX#gul2 MOD256:LDY#gul2 DIV256:L
DA#7:JSR&FFF1:LDAacorns:BNEntcy:LDA#&E
0:STAdead:.ntcy RTS
 840.tlen EQUB0:.score EQUW0:.vist EQ
UW0:.sccol EQUB1
 850.insc SED:LDAscore:CLC:ADC#2:STAs
core:LDAscore+1:ADC#0:STAscore+1:CLD:R
TS
 860.psc LDA#17:JSR&FFEE:LDAsccol:JSR
&FFEE:LDA#31:JSR&FFEE:LDA#1:JSR&FFEE:L
DA#2:JSR&FFEE:INCsccol:LDAsccol:CMP#4:
BNEdigs:LDA#1:STAsccol
 870.digs LDAscore+1:JSRpbyt:LDAscore
:JSRpbyt:LDA#48:JMP&FFEE
 880.pbyt TAX:LSRA:LSRA:LSRA:LSRA:JSR
pnib:TXA:AND#&F:.pnib CLC:ADC#48:JMP&F
FEE
 890.ivist SED:LDAvist:CLC:ADC#1:STAv
ist:LDAvist+1:ADC#0:STAvist+1:CLD:JMPp
vist
 900.dvist SED:LDAvist:SEC:SBC#1:STAv
ist:LDAvist+1:SBC#0:STAvist+1:CLD
 910.pvist LDA#31:JSR&FFEE:LDA#14:JSR
&FFEE:LDA#19:JSR&FFEE:LDA#17:JSR&FFEE:
LDA#3:JSR&FFEE:LDAvist+1:JSRpbyt:LDAvi
st:JMPpbyt
 920.deccals LDY#7:LDA#0:.dclp STA(ca
ls),Y:DEY:BPLdclp:LDAcals:SEC:SBC#8:ST
Acals:LDAcals+1:SBC#0:STAcals+1
 930LDAcals:CMP#&48:BNEcok:LDAcals+1:
CMP#&7C:BNEcok:STAdead:RTS:.cok RTS
 940.inccals LDAcals:CMP#&68:BNEicok:
LDAcals+1:CMP#&7D:BEQcok
 950.icok LDAcals:CLC:ADC#8:STAcals:L
DAcals+1:ADC#0:STAcals+1:LDY#7:.iclp L
DA&A80,Y:STA(cals),Y:DEY:BPLiclp:RTS
 960.caltm EQUB15:.calor DECcaltm:BEQ
ttdc:RTS:.ttdc LDA#15:STAcaltm:JMPdecc
als
 970.acorns EQUB0:.actim EQUB0:.accon
 EQUB0:.acflag EQUB0:.acx EQUB0:.acy E
QUB0
```

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```
 980.ctacorn DECactim:BEQctac:RTS:.ct
ac  LDAaccon:STAactim:BITacflag:BMIdeca
y:LDA#&40:STAscr:LDA#&64:STAscr+1:LDA#
&E0:STAdat:LDA#9:STAdat+1:JSRprint
 990LDX#acso MOD256:LDY#acso DIV256:L
DA#7:JSR&FFF1
 1000.posnac JSRrandom:TAX:JSRrandom:T
AY:STXacx:STYacy:JSRcalc:LDY#0:LDA(cal
),Y:BNEposnac:LDA#&E0:STA(cal),Y
 1010LDA#&FF:STAacflag:RTS
 1020.decay LDA#&40:STAscr:LDA#&64:STA
scr+1:LDA#0:STAdat:LDA#9:STAdat+1:JSRp
rint:LDX#moso MOD256:LDY#moso DIV256:L
DA#7:JSR&FFF1
 1030LDA#&40:STAscr:LDA#&69:STAscr+1:L
DA#&A0:STAdat:LDA#9:STAdat+1:JSRprint
 1040LDXacx:LDYacy:JSRcalc:LDY#0:LDA#&
A0:STA(cal),Y:LDA#0:STAacflag:RTS
 1050.seed EQUB RND(256):.random LDAse
ed:ROLA:ROLA:ROLA:SEC:ADCseed:EORtimer
:STAseed:AND#31:RTS
 1060.mocon EQUB15:.motim EQUB15:.mtx
EQUB0:.mty EQUB0
 1070.mould DECmotim:BEQspread:RTS:.sp
read LDAmocon:STAmotim:LDA#maze MOD256
:STA&8C:LDA#maze DIV256:STA&8D:LDA#sha
dow MOD256:STA&8E:LDA#shadow DIV256:ST
A&8F
 1080LDX#4:.copl1 LDY#0:.copl2 LDA(&8C
),Y:STA(&8E),Y:INY:BNEcopl2:INC&8D:INC
&8F:DEX:BNEcopl1
 1090LDA#(maze-32)MOD256:STA&8C:LDA#(m
aze-32)DIV256:STA&8D:LDA#(shadow-32)MO
D256:STA&8E:LDA#(shadow-32)DIV256:STA&
8F
 1100LDY#0:STYmty:.spml1 LDX#0:STXmtx:
.spml2 LDY#32:LDA(&8E),Y:CMP#&A0:BNEnt
mo
 1110LDY#0:JSRreg:LDY#31:JSRreg:LDY#33
:JSRreg:LDY#64:JSRreg
 1120.ntmo INC&8C:BNEdi8D:INC&8D:.di8D
 INC&8E:BNEdi8F:INC&8F:.di8F INCmtx:LD
Amtx:CMP#32:BNEspml2:INCmty:LDAmty:CMP
#32:BNEspml1:RTS
 1130.reg LDAmtx:BNEnle:CPY#31:BEQnrgn
:.nle CMP#31:BNEnre:CPY#33:BEQnrgn:.nr
e LDAmty:BNEnte:CPY#0:BEQnrgn:.nte CMP
#31:BNEnbe:CPY#64:BEQnrgn
 1140.nbe LDA(&8E),Y:BNEnrgn:LDA#&A0:S
TA(&8C),Y:.nrgn RTS
 1150.main LDA#237:STAtimer:JSRmvsam:J
SRcalor:JSRctacorn:JSRmould
 1160JSRwindow:LDAdead:BNEdied:.wait B
ITtimer:BMIwait:BPLmain:.died RTS
 1170.br EQUB0:.sr EQUB0:.sc EQUB0:.to
k EQUB0:.char EQUB0:.bx EQUB0:.by EQUB
0
 1180.mazgen LDA#maze MOD256:STAmazpt:
LDA#maze DIV256:STAmazpt+1:LDA#0:STAbr
:STAby:.genl6 LDA#0:STAbx:.genl1 LDYbr
:LDAmazdat,Y:JSRtoken
 1190INCbr:INCbx:LDAbx:CMP#8:BNEgenl1:
INCby:LDAby:CMP#8:BNEgenl6:RTS
 1200.token ASLA:ASLA:ASLA:ASLA:STAtok
:LDA#0:STAsr:.genl2 LDA#0:STAsc:.genl4
 LDAsr:ASLA:ASLA:CLC:ADCsc:CLC:ADCtok:
TAY:LDAtokdat,Y:JSRchara
 1210INCsc:LDAsc:CMP#4:BNEgenl4:INCsr:
LDAsr:CMP#4:BNEgenl2:RTS
 1220.chara ASLA:ASLA:ASLA:ASLA:ASLA:P
HA:LDAsr:ASLA:ASLA:ASLA:ASLA:ASLA:CLC:
ADCsc:STAmazpt:LDAbx:ASLA:ASLA:CLC:ADC
mazpt:TAY
 1230LDA#0:STAmazpt+1:LDX#7:LDAby:.gen
l3  ASLA:ROLmazpt+1:DEX:BNEgenl3:CLC:AD
C#maze  MOD256:STAmazpt:LDAmazpt+1:ADC#
maze  DIV256:STAmazpt+1:PLA:STA(mazpt),
Y:RTS
 1240]NEXT:ENDPROC
 1250REM Block Token Data
 1260DATA00000000,55555555,08080808,00
AA0000
 1270DATA08AA0808,96969696,AA5555AA,82
000082
 1280DATA2A808082,A8020282,0525A820,08
2A5850
 1290DATA8280802A,820202A8,02900048,41
282841
 1300REM Graphics Data
 1310DATA0,0,0,0,0,0,0,0,4444AAAA,5555
0000,44AAAA00,55000044,AA002222,4444AA
,222255,22225555
 1320DATA337F7F7F,111F3F3F,CCCDCDCD,8E
8E8E,470717,B1B0B,72727,8B1B2B,3130100
0,F2F07270,C0C08000,F0F4E0E0,F2F0F5F0,
307072F0,F0F0F4F0,C0E0E0F8
 1330DATA3120100,7430725,480C0800,862C
860E,11110F2D,11111111,88880F0F,888888
88,3362513,3EBFCF32,8E2C4C88,C6E977D,F
AFDF56,137417DB,CFACAEC8,82E6EF7
 1340DATA16160303,5B5B2D2D,86860C0C,AD
AD4B4B,2D2D5B5B,3031616,4B4BADAD,C0C86
86,77333311,7F7FFF77,E8C0C080,FFFFFFE8
,F3F3F,132757AF,FFFFFF,4CEAE4FA
 1350DATA7070303,3534A1F,E0E0C0C,F8F8F
8F,F4B4303,3030707,F0F0F0F,C0C0E0E,707
0303,F1F1F1F,E0E0C0C,CAC258F,F0F0F0F,3
030707,F2D2C0C,C0C0E0E
 1360DATA16060202,2E2E0F0F,86060404,F0
F0F0F,F0F0F3F,3030707,F0F0F0F,C0C0E0E,
7070303,F0F0F0F,E0E0C0C,CFCF0F0F,F0F0F
0F,2020616,F0F4747,4040686
 1370DATA69690606,6066969,0,0,17170703
,3070707,48E0E0C,C0E0E0C
>*SPOOL
```


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(16K EPROM & FULL MANUAL)

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(14) /E+ASR/ **£17.38 ex VAT £19.99 inc VAT**

An alternative to the DFS on rom for Plus 3 and ABR users. This optional alternative DFS is designed for use in Sideways RAM (ABR) and allows the user to operate a disc filing system &Eøø when using the Plus 3 (in ADFS page would normally be &1Døø). The DFS is simply loaded using the software supplied with the ABR from disc. (3.5" ADFS disc + manual)

ADVANCED ELECTRON DFS

(05) /E/ **£21.00 ex VAT £24.15 inc VAT**

Electron & Plus 3 users. . . gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. We can also supply 5.25" disc drives to add to your Plus 3 (inc. 2nd. drive adapter). "ACP has produced another superb ROM for the Electron". . . Electron User Feb '86

(supplied on 16K EPROM + DFS MANUAL)

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A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40 track discs to 80 track discs, verify two non-standard discs.

("ADI features an extremely comprehensive sector editor, and one of the finest I've seen". . . Tubelink on Prestel) (supplied on 16K EPROM + manual)

ADVANCED 1770 DFS

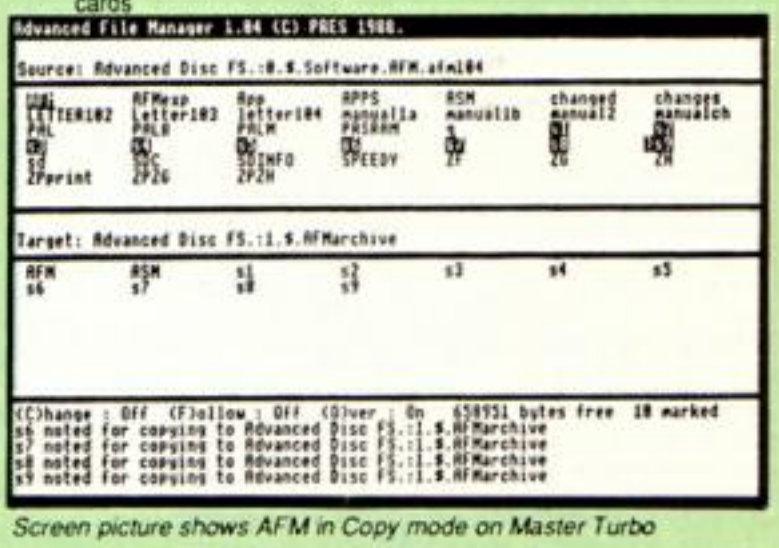
3 versions ADM/C(11) – ADB(12) ADE (13) **£30.00 ex VAT £34.50 inc VAT**

ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is a very fast and powerful disc filing system with the ability to operate in double density occupying both sides of a disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC. (16K EPROM + comprehensive manual)

PRES – ADVANCED FILE MANAGER

The ultimate 'front-end' for ADFS and DFS includes:

Menu – infinitely expandable
Delete – deletes any number of files
Rename – rename multiple files using wild-cards
Copy – extremely comprehensive file copier



Screen picture shows AFM in Copy mode on Master Turbo

AFM follows the PRES 'Master Plan' of upwards compatibility – it runs on Electron, BBC B, B+, B+128, Master 128 and Compact, with Second/Co-processors and Acorn-compatibile versions of DFS & ADFS.

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AFM has four distinct modes:

MENU – allows browsing through the files and directories on a disc. Files are started from a menu of up to 7 options chosen for a selected ROM. Loaders are provided for Basic, The Basic Editor, View, ViewSheet, ViewStore, ViewSpell, Edit, Wordwise (+) and InterWord. This list can be expanded infinitely using an Acorn-approved OSWORD call. . . full details and example in the manual..

DELETE – allows files to be marked and then deleted with one keystroke.

RENAME – allows one or more files to be marked and then renamed using a wildcarded name, ie one which varies with each file renamed. Thus you could rename s1, s2 and s3 to be s1_old, s2_old, and s3_old in one operation. . . and that's only the beginning! As well as using the whole of the original name you can also pick out individual characters to form part of the new name.

COPY – the strongest feature of AFM. It is a two stage copy routine. With both source and target directories shown on screen the files to be copied are marked. Once all the files have been marked copying is started and the computer can be left to get on with it!

Large files can be split across several disks, and recombined.

As much as possible of the computer's memory is used for copying files, including unused parts of shadow screen memory, sideways ram banks (inc. AP7), ram cartridges (inc. ABR (32K) and AQR (256K)), tube memory (up to 61K), B+ paged ram (12K) and unused parts of the Slogger Master Ramboard (Electron).

Comprehensive error trapping and recovery is provided, so a copying run will rarely have to be aborted unfinished! And there's much, much more.

DATABASE PUBLICATIONS: Electron software now available exclusively through PRES on 3.5" disc

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**Back issues of Electron User required, see Database Publications own advertisement*

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4. **Only to cash cheques & credit card receipts when we know we can supply the goods ordered.**

THE ADVANCED PLUS 3

Now you can turn your Electron & +1 into a full disc system – no more waiting for tape loading or 'bad block'/'data?' messages. A.P.3. gives you . . .

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5. Welcome disc
6. Utilities
7. Full documentation
8. All the advantages of the original Plus 3 PLUS extra ROM socket.

All this without dramatically increasing the required desk space!
Now well into the SECOND THOUSAND production.
Remember – 2nd drives (3.5 or 5.25) can be added and the AP3 drive can be used on a BBC or Master computer! Also most Electron disc-based software is supplied on 3.5" ADFS discs.
The only fully compatible disc upgrade running Acorn's own preferred filing system (supplied on: Plus 3, Master 128, Master Compact and now the Archimedes)

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3 games on disc – SNAPPER – DRAUGHTS – REVERSI

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ADVANCED PLUS 1 . . . The plus 1 is the main expansion for the Electron. It provides the Centronics parallel printer, port, joystick interface and 2 cartridge slots into which go ROM cartridges including View, Viewsheet, Pascal, Logo and our own popular range of disc upgrades.
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ADVANCED PLUS 6 . . . a fully buffered 6 ROM expansion module for the Electron user. AP6 is fitted inside the advanced Plus 1 or a modified Acorn Plus 1 (when used with the Acorn Plus 3, 5 ROM sockets are available). All sockets are designed to accept either ROM/EPROMS or RAM chips. A further feature is the optional AP7 upgrade.
"A marvellous piece of design . . . don't hesitate, buy it!"–*EU, May '88*
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UPGRADE SERVICE for the original Acorn Plus 1 to Advanced Plus 1 and AP6. This will provide all the benefits of AP6 and also includes the printer circuit modification for some modem printers. (AP6 can be fitted to original Plus 1 by users with soldering experience) for upgrade service add £7.00 + VAT to AP6 price ie
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ADVANCED ROM ADAPTER 2
An Acorn approved cartridge containing a card with special 'zero' profile sockets that allow you to fit compatible 8k or 16k EPROMS/ROMS. The cartridge is fully enclosed providing complete protection for your ROMS. Simple to use – No switching – complies fully to the Acorn (sideways) Rom filing system.
"The best ROM cartridge is by far the ARA 2...*A&B Dec 86*
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A standard Acorn approved cartridge but containing 32k (2 x 16k) of sideways RAM. The added bonus is the battery-backed feature that holds the RAM contents when the power is switched off! Different ROM images can be loaded into either bank from ROM images previously saved. The banks can also be locked to imitate ROM use. Now it is possible to have View & ViewSheet in one cartridge every time you switch on. Other uses include &E00 ADFS, printer buffer, ROM software development. The use of ABR is simplified by the newly written PRES software utilities which include:- SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeROM a new utility to put your own software from disc or tape into ABR & use the ROM filing system. All software is supplied in ABR with a simple menu to transfer the utilities to your own media. No hardware switching – totally software controlled. Instructions for using supplied software and necessary information for users developing their own applications.
"It's a superb add-on and a must for all serious Electron users". . . *Electron User*
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DISC INTERFACES (Plus One required)

AP3 INTERFACE: As supplied with AP3 package. A fully Acorn compatible disc interface that will accept any standard 5.25" or 3.5" 80T drive with PSU. It runs Acorn's ADFS (as supplied on Acorn Plus Three, Master 128, Master Compact and now the Archimedes) supplied with A.D.F.S. manual and welcome disc + Utilities and 3 bonus games (please specify 3.5" or 5.25" 80T format). Also provides a spare 16K rom socket. **Price £52.00 ex VAT £59.80 Inc VAT**

AP4 INTERFACE: A fully Acorn compatible disc interface that will accept any standard 5.25" or 3.5" drive with PSU. It runs the 1770 DFS (as fitted in the BBC 'B' and Master) keeps pace at &E00 – has utilities in rom and provides a spare 16K rom socket (DFS manual included.
Price £60.83 ex VAT £69.95 Inc VAT

AP34 INTERFACE: Get the best of both filing systems. Now available from PRES the ultimate interface. Fitted with both Acorn approved filing systems. . . Acorn's current standard ADFS and Acorn 1770 DFS (which can be run at &E00) ADFS and DFS manuals supplied + ADFS welcome disc with utilities. **Price £69.55 ex VAT £79.98 Inc VAT**
Please state 5.25" or 3.5"

ADVANCED PLUS 2 ROM

We feel this is one of the best, low cost, additions we have produced for the Electron & +1 user, especially for Plus 3, AP3 & ABR users.
Now with this easy to fit upgrade you can add:

1. Fix for Tape filing system in Hi-res screen modes.
2. *ROMS – to display all ROMs/ROM images present on the system.
3. *UNPLUG – disable ROM/RAM image.
4. *INSERT – enables or inserts a previously unplugged ROM.
5. *KILL – to totally disable the Plus 1.
6. *LOCK – to lock a sideways RAM bank in ABR, AQR, AP7.
7. *LROMS – to lock all sideways RAM banks found.
8. *UNLOCK – to unlock a sideways RAM bank in ABR, AQR, AP7.
9. *UROMS – to unlock all sideways RAM banks found.
10. *SAVEROM – saves a copy of a ROM image to the current filing system.
11. *LOADRUN – loads a ROM image from the current FS into a RAM bank.
12. *FORMAT – will format an ADFS disc for Plus 3 or AP3.
13. *VERIFY – reads and tests every sector on an ADFS disc.
14. *VFORM – formats and verifies an ADFS disc in one command.
15. *BUILD – creates a text file that can be used by *EXEC (ie !BOOT).
16. *LIST – displays a numbered listing of a text file.
17. *TYPE – displays a file on screen with no line numbers.
18. *DUMP – to view a file's contents on screen.
19. *LANG – selects a default language to be booted on <CTRL-BREAK>
20. *HELP – provides a full 'help' list on all the ROM's commands

STOP PRESS

21. *AQRPAGE– selects the specified page in any AQR present.

Now there is no need to search for your utilities disc every time you want to Format/Verify a disc, Build a !Boot file or Lock/unlock/Load a ROM image into ABR PLUS much more . . . the ideal companion from the company that produces the Acorn Plus 1.
£11.00 ex VAT; £12.65 Inc VAT
"The AP2 is the definitive Plus 1 Rom. . . I'm not sure what I'd do without it. . . Like all of PRES'S other products it's been well worth waiting for." EU July '88

PRES ABR SOFTWARE
The new PRES ABR software now available separately containing: SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeROM a new utility to put our own software from disc or tape into ABR & use the ROM filing system. Supplied on 3.5" ADFS or 5.25" DFS disc.
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An internal battery-backed RAM upgrade for the Advanced Plus 6. TWO 16K pages of Sideways RAM, battery-backed and featuring full write protect facility. Just like ABR but fitted internally & vacating a cartridge slot. This product is compatible with all Acorn BBC/Master & Electron computers. **£39.50 ex VAT; £45.42 Inc VAT**

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ADFS VERSION 1.1
Suitable for existing Plus 3 or A.P.4 users. This new version has the software fixes for Zysyshelp, write protect disable & compaction. Also Winchester code has been replaced with the necessary driving software to handle AQR as a 256k RAM DISC. Please note – ADFS is Acorns adopted standard filing system supplied on the Plus 3, Master 128, Master Compact & now the Archimedes. Supplied on 16k ROM with Welcome disc & utilities. Please state 3.5"/5.25" welcome disk.
£14.95 ex VAT; £17.19 Inc VAT
(ADFS manual supplied separately)

ADFS E00
For ELectron users with either Plus 3 or A.P.4 and 32k of S/W RAM i.e. ABR. All the benefits of ADFS but without all the loss of RAM! Includes all the software 'fixes' as in version 1.1 as well as the AQR/RAM DISC code and an 'FX' call for managing the new & original ADFS. One of the most frequent questions we are asked: "How do I get back the memory lost on my Plus 3 system?" Answer: PRES ADFS &E00 regains 3.75k leaving page @ &E00 the same as Tape!
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Music 5000 is supplied as a powerful, stereo, digital, eight voice, 16 channel synthesiser with ROM software (containing the AMPLE language), disc software containing the example music files and full documentation.
The requirement for Electron Music 5000 is . . . Electron, Plus 1, disc system (3.5 or 5.25 drive) running DFS or ADFS (preferably @ &E00) i.e. Acorn Plus 3, A.P.3 or A.P.4, 1 MHz bus (best option A.P.5.), and hi-fi amplifier or similar (Music 5000 has a standard 5-pin DIN audio connector for sound output). (Please state disc size & FS when ordering) **£99.00 (ex. VAT) £113.85 (Inc. VAT)**

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Write your own arcade smashes using the

ARCADE GAME *Creator*

Arcade Game Creator is a suite of programs for the Electron and BBC Micros. Taken from the pages of *Electron User,* it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

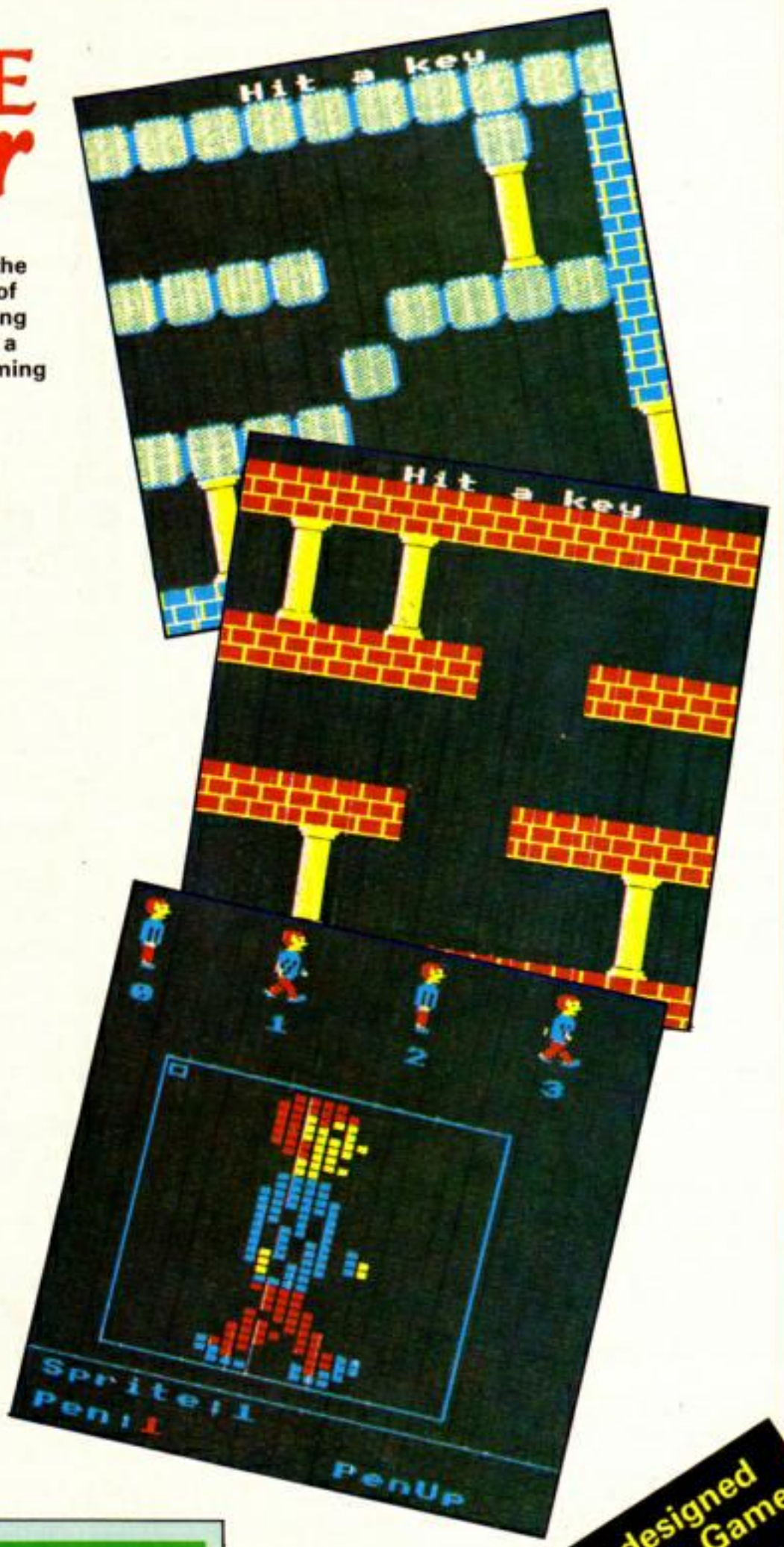
- A Mode 5 sprite editor that lets you design your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines.

. . . and much, much more.

To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

Written in an easy to read style and with many illustrations and screen shots, it contains all the information you need to create and animate sprites, to design backgrounds and to link the two together into a complete arcade game.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!



Screens designed using Arcade Game Creator

Arcade Game Creator	
Tape + manual	£9.95

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Saving for certain

Ensure your programs are stored correctly with Julie Boswell's handy verify utility

THE Electron is extremely reliable when saving and loading programs to and from floppy disc, which is one of the reasons why many owners upgrade to a disc system. Unfortunately though, the basic Electron is entirely dependent upon the more temperamental cassette recorder for its storage medium, and occasionally problems can occur with well worn tapes and recorders.

Errors are rare, but sometimes the cassette system can develop a minor fault – perhaps the tape heads simply need cleaning or adjusting – and our program which we spent several hours typing in refuses to load. What can be done?

One precaution we can take is to ensure that the programs we save to tape – and to disc for that matter – are stored correctly and can be loaded back. The Electron's *CAT command helps a lot here, as it will read the tape and check that the program saved can be read back without error.

What it doesn't do is to check that the program you have just saved is identical to the one in memory. An error could have occured when saving which corrupted the program as the data was being put on tape. If the Electron can read it back correctly everything will appear to be OK with *CAT until you come to load it next time, when you'll get a *Bad program* error message.

Some micros have a built in VERIFY command which checks that the program on tape can be loaded and that it is identical to the one in memory. The Electron hasn't got such a command, but it is quite easy to write one ourselves. The following Basic listing will do the job:

```
*OPT1,2
CLS
INPUT ' "Name";n$
H%=OPENIN n$
I%=PAGE
REPEAT
  F%=(?I%=BGET#H%)
  I%=I%+1
UNTIL F%=0 OR I%=TOP
CLOSE#0
IF F% PRINT"OK" ELSE PRINT"Corrupted"
END
```

There are several ways it can be implemented, probably the easiest being as a function key definition. As the program is quite lengthy, all the Basic commands should be abbreviated like:

```
*KEY1 *OPT1,2|MCLS:I.' "Name";n$:H%=0
P.n$:I%=PA.:REP.:F%=(?I%=B.#H%):I%=I%
+1:U.F%=0 OR I%=TOP:CLO.#0:IFF%P."OK"
EL.P."Corrupted!"|M
```

Once you have defined the key, using it is a piece of cake. After saving a Basic program press f1 and enter its name at the prompt. Rewind the tape to the start and press Play. The program saved will be compared byte for byte with the one in memory.

If there are no errors an *OK* message is printed, but if there are problems you get a *Corrupted!* message. If this happens re-save the program and verify it again. The utility works just as well with the disc system, and has the advantage of being extremely quick to boot.

An alternative way of implementing the verify routine is to write it in machine code and store the routine in some unused part of memory. The assembly language listing is a direct conversion of the Basic program, so it should be relatively easy to follow. The routines used are taken directly from Roland Waddilove's discs series which started in the November 1988 issue of *Electron User* so take a look at this for a further detailed explanation.

To use it, first enter and save the assembly listing. Run it to create and automatically save the machine code verify routine with the name MVERIFY. You can now type NEW and enter – or load – any Basic program and after saving it type CALL &900 to check that it has been stored correctly on tape. Disc drive owners can simply enter *MVERIFY to call up the routine.

```
10 REM Machine code verify
20 REM By Julie Boswell
30 REM (c) Electron User
40 charptr=&70
50 progptr=&72
60 tempy=&74
70 osbyte=&FFF4
80 osword=&FFF1
90 osasci=&FFE3
100 osfind=&FFCE
110 osbget=&FFD7
120 FOR pass=0 TO 2 STEP 2
130 P%=&900
140 [ OPT pass
150
160 \*OPT1,2
170 LDA #139
180 LDX #1:LDY #2
190 JSR osbyte
200
210 \Input filename
220 JSR print
230 EQUS "Name?"+CHR$0
240 LDA #0
250 LDX #block MOD 256
260 LDY #block DIV 256
270 JSR osword
280
290 \Open file for input
300 LDA #&40
310 LDX #filename MOD 256
320 LDY #filename DIV 256
330 JSR osfind
340 TAY  \channel number
350
360 \check file
370 LDA #0:STA progptr
380 LDA &18:STA progptr+1  \Get PAGE
390 .loop
400 JSR osbget  \Get byte
410 STY tempy:LDY #0  \save Y
420 CMP (progptr),Y
430 BNE different
440 LDY tempy  \restore Y
450 CLC
460 LDA progptr
470 ADC #1
480 STA progptr
490 LDA progptr+1
500 ADC #0
510 STA progptr+1
520 CMP &13:BNE loop
530 LDA progptr
540 CMP &12:BNE loop
550
560 \File saved OK
570 JSR print
580 EQUS "Saved OK":EQUW 13
590 LDA #0:TAY
600 JMP osfind  \close file+exit
610
620 \File corrupted!
630 .different
640 JSR print
650 EQUS "Corrupted!":EQUW 13
660 LDA #0:TAY
670 JMP osfind  \close file+exit
680
690 .print \in-line string
700 PLA:STA charptr
710 PLA:STA charptr+1
720 LDY #0
730 .loop
740 INC charptr:BNE here
750 INC charptr+1
760 .here
770 LDA (charptr),Y:BEQ end_print
780 JSR osasci
790 JMP loop
800 .end_print
810 LDA charptr+1:PHA
820 LDA charptr:PHA
830 RTS
840
850 .block
860 EQUW filename
870 EQUB 11
880 EQUB 33
890 EQUB 126
900
910 .filename
920 EQUS "**********"
930 ]
940 NEXT
950 OSCLI"SAVE MVERIFY 900 "+STR$~P%
```

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

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MICRO MESSAGES

Starting out seriously

DESPITE having had both my micro and Electron User *for quite a while I am only just beginning to use it for anything other than playing games. I am presently working my way through the book Getting Started in BBC Basic by Mike Bibby.*

Although I am aware that I will need either the Pres Advanced Plus One or Slogger's Rombox Plus as the basic add-on for my Electron, I am unsure of which to buy. Please could you advise me which is best, and if I could use other Pres products with the Rombox Plus, and vice versa?

Also, please could you tell me which is the best graphics utility available? I am hoping to use this for architectural drawings, and have been looking at Slogger's Picasso. What other equipment will I need, if any? – **Ralph Kyte, Birmingham.**

● There's little to choose between the Slogger Rombox Plus and the Pres AP1, so it's just a matter of personal taste. We prefer the AP1 as it matches the Electron's colour and style.

You should be able to use all Pres and Slogger add-ons with either of these products, but have this confirmed before you buy any add-on, as there have been one or two problems in the past.

The AMX Mouse and AP5 from Pres is a superb, though expensive, combination which is ideal for producing high quality graphics. Slogger's Picasso is a slightly less powerful package, but is quite a lot cheaper. Both come with all the necessary hardware and software.

Corrupted directions

MANY thanks for the articles about the use of discs. As I use the Electron for serious purposes I find them very informative. I hope that in future articles you will be able to deal with the problem of the ADFS' Broken directory *error message.*

This is a recurring problem which only seems to be resolved by formatting the disc and starting again. It is also quite easy to transfer the complaint to the backup before you know that it exists, in which case you have lost the whole of that directory.

I would think that it should be possible to retrieve the situation with the use of a disc sector editor utility. I am sure the answer lies in track zero sector two, but unfortunately. I cannot find my way round the editor sufficiently to identify the corrections needed.

It would be of considerable help to me, and I am sure many others, if you could spell out the necessary steps needed to put things right. – **T.C.A. Long, Leicester.**

● This error means that the currently selected directory has somehow become corrupted and the ADFS can't read it. It's not possible to say what the cause of the error is, or how to cure it because it could be due to quite a number of things.

To avoid this error here are a number of basic precautions to be observed:

- Always use good quality discs.
- Keep them away from magnetic sources.
- Don't switch the micro on or off with a disc in the drive.
- Don't take a disc out or put one in when the drive light is on.
- Don't press the Break key when the drive light is on.
- Don't swap discs without entering *DISMOUNT and *MOUNT.

Search for Beach Head

FOR many years I have been looking for a copy of Beach Head for the Electron but so far without success. If you could tell me where I can obtain one I would be very grateful. – **Kevin Toogard, Sheffield.**

● This was reviewed way back in the December 1985 issue of *Electron User* and it was marketed by US Gold, so contact them for a copy. It is a great game and we're surprised it hasn't yet appeared on a compilation.

Charting complaints

I WOULD like to complain about the way that the Gallup computer games chart is presented. The majority of the software in the chart is budget – £1 to £3 – games which have either already been issued at the full price or are not of very good quality, and are bought only because of their price.

To allow people to see what the most popular quality new games are I would think the best format for this chart would be a Top 10 for the more expensive games, a Top 10 to show the popular cheaper games and a compilations Top 10. This would give a truer picture of the Electron games market. – **Andrew Cossar, Houston, Renfrewshire.**

● The current chart is an accurate list of the best selling Electron software. If it is dominated by budget titles then that is a true reflection of what Electron users are buying.

The simple fact is that budget title sales far outrun many full priced games and if we altered the chart it wouldn't be a true representation of the market.

Snapshot taped

I BUY Electron User *every month and read it cover to cover. I thought you might be interested in my amendment to the Snapshot utility in the September 1987 issue. To convert it for use on tape and to save a Mode 4 or 5 screen make the following changes:*

```
370 EQUS "SAVE SCRO 5800 8000"
395 *OPT 1,0
```

*Also is it possible to make *KEY10 commands still work even when Control+Break has been pressed? Finally do your sprite designer and print routines work on the BBC B and Master?* – **Oliver Restorick, Axminster, Devon.**

● It is fairly easy to intercept the Control+Break key function, but it must be carried out from machine code. When this combination of keys is pressed the operating system checks for a JMP instruction at &287.

If one is present the OS performs a JSR &287 twice – once with the carry flag clear before the startup messages have been printed, and again with carry set after this has been performed.

The example program listed here does nothing the first time it is called, but on the second occasion it programs the Break key – *KEY10 – with OLD and RUN using an oscli command.

The first *FX at the end of the listing inserts a JMP instruction at &287, and the fol-

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lowing two *FXs store the location of the start of the machine code – &900 – in the two following memory locations low byte first, followed by the high byte.

```
10 REM Control+Break intercept
20 oscli=&FFF7
30 osbyte=&FFF4
40 FOR i=0 TO 2 STEP 2
50 P%=&900
60 [ OPT i
70 BCC exit
80 LDX #key MOD 256
90 LDY #key DIV 256
100 JSR oscli
110 .exit
120 RTS
130
140 .key
150 EQUS "KEY10 OLDIMRUNIM"
160 EQUB &0D
170 ]
180 NEXT
190 *FX247,76
200 *FX248,0
210 *FX249,9
```

Once this program is run, whenever Break or Control+Break is pressed OLD and RUN is automatically executed, so it will be impossible to break out of any Basic program that is loaded and run.

You could program the Break key to perform other actions if you wished. Simply enter the function key definition in line 150.

Driven round the bend

IN reply to the letter from S. Stevenson in October 1988's Micro Messages saying that he cannot run Driver II from the August 1987 issue, I am not at all surprised, as I spent hours, days even, rechecking my listing, all to no avail.

It was not until I had a look at the previous printer driver that I realised what the error was. You stated that the program should be run by entering View and typing LOAD DRIVER. The correct method is simply PRINTER DRIVER.

Since buying a printer I have been going through my back issues of the magazine and have typed in and run View Spell Check from the May 1987 issue. This works very well, but if you enter utilities *this ends up as* utilitie *with your program. Similarly* has *will be entered as* ha. *Mr Ecott is quite right with his amendments in the June 1987 Micro Messages.*

I have also entered Dictionary Lister from W. Buttigieg in the July 1987 Micro Messages. This works very well, but how do you delete any incorrect entries you may have made?

*He also included a change disc routine, but this does not work, it appears due to the inclusion of the instruction *MOUNT. I came across this before in a listing in* The Micro User. *Is there any equivalent on the Electron?* – **R. Waite, Bristol.**

● Sorry about the wrong instruction to install the driver, it should be PRINTER and not LOAD. We made the amendment soon after in Micro Messages.

The S is chopped off words in order to save space, otherwise plurals like *number* and *numbers* would be stored twice, when in fact, they are the same word. Also common endings like *ing* are chopped off.

It does mean that words like *has* are stored as *ha*. This doesn't affect the spelling checker most of the time as it takes all this into account. However, it isn't infallible, as it will assume that *ha, has* and *haing* are correct words.

It is possible to improve the program's intelligence regarding this, but it would have made it considerably longer, and it was felt that this wasn't too essential.

You can correct any wrong dictionary entries by loading it into View and editing it as a normal View file. Save it to disc as usual when you've finished.

It sounds like you have a DFS rather than an ADFS if you are experiencing problems with *MOUNT. You should ignore this command as you don't need it, ADFS owners do.

Breaking into a game

I AM probably writing on behalf of all Elite players. A couple of minutes before writing this letter I was playing my best game of Elite to date. I had progressed from the rating of Harmless to Average, keeping my legal status as Clean.

I had bought everything from an extra missile to a Galactic Hyperspace, but while I was deciding which planet to go to I caught the Break key – it is situated next to the right cursor key – wiping the game from memory before I could save it to tape. Is it possible to deactivate the Break key while playing Elite? – **Christopher Watson, Wigan, Lancashire.**

● It may have been possible for the programmers when writing the game to prevent Break from wiping the memory, but it isn't possible to add this feature now. To prevent this happening again save your position every time you dock at a space station.

Doubling up chips

ader of your magazine for a year or so, and wish to congratulate you on its new face-lift.

In response to John Bloxham's question in the December 1988 issue of Electron User *about transferring the View and Viewsheet rom chips into a dual cartridge, it just isn't possible. By a strange coincidence, I had the very same idea myself only last week.*

To my horror, after I had virtually destroyed the Viewsheet cartridge case in order to get at the PCB I discovered that the makers had encapsulated the chip – which, incidently, is not actually soldered or connected via a DIL socket – in black plastic potting compound. This is presumably to protect it from either static or people trying to remove it.

Even if you did manage to separate the chip from the PCB, it is so small – less the 1cm square – that it would be physically impossible to use a soldering iron with the required accuracy. – **John Moye, Colchester, Essex.**

● It appears that there is more than one version of the View cartridge, as ours has the roms soldered to the PCB. They could quite easily be removed, given the proper tools, and soldered into a single cartridge.

Instant connection

BARRY Wood's Phone Call Calculator program in the December 1988 issue of Electron User *is useful, but it lacks the facility to start the calculation at the exact instant of connection.*

If you add the following lines then pressing any key will start the calculation at the appropriate moment:

```
382 PRINT TAB(0,12)"Press any key to start"
384 key=GET
```

To stop the calculation using the S key it should test for lower case S too, and it is also useful to display the total cost at the end:

```
525 IF INKEY$0="s" end=TRUE
542 MODE 6
544 PRINT End of call"
546 PRINT"Total cost=";INT(cost);"p"
```

– **David Fidler, Hilmarton, Calne, Wiltshire.**

Small feeds are best

IN response to several letters concerning the Brother HR-5 printer and the problem with the line feed when producing screen dumps, here is the solution: The difficulty is that the HR-5 was produced in two versions, one with the line feed set at 1/36th of an inch, and the other set at 1/72nd of an inch – which is used by most dumps included in commercial software.

My own HR-5 came with the 1/36th feed, so I wrote to Brother who replaced the eprom chip free of charge. I only paid the postage to return the printer to them. I hope that other readers with the same problem will benefit from this knowledge.

I'll take this opportunity to thank you for a wonderful magazine. I have them all from week one – which I guard very jealously. However, I do have one suggestion. How

about a swap corner or small ads section? I am sure, that like myself, many users have surplus add-ons and so on knocking around. – **Peter Naylor, Leeds, West Yorkshire.**

● Thanks for pointing out the different HR-5 line feeds, we hadn't heard of this until now. As for the small ads section, we'll bear it in mind. How do other readers feel?

More on the menu

AFTER receiving an AP3 disc interface from Pres I typed in the disc menu program from the May 1987 issue of Electron User. *I found it to be excellent and I have now included it in a !Boot file for all my discs. However, I find that the program will only display a maximum of 31 files.*

Is there anyway for the program to check if the file to be loaded is a rom image and hence load it into sideways ram using ACP's RLOAD command?

Finally, was there an error in the Boot Rom program accompanying the ABR review in the June 1987 issue, as I cannot get it to work? I want my Electron to automatically load the !Boot file containing the disc menu whenever I turn the computer on, but when I load the image created by Boot Rom into ABR and switch off and on again nothing happens.

Thanks to all at Electron User *for an excellent well balanced and informative magazine.* – **Dave Browne, Leeds, West Yorkshire.**

● The disc menu program was written on a DFS system and the maximum number of files that the directory can hold is limited to 31.

However, the menu also works with the ADFS but will still only read 31 files. To increase this to the maximum of 47 that the ADFS allows change the variable *maxfiles* to 47 in line 570.

You can't tell the difference between a machine code file and a rom image, so it's not possible to load it automatically into sideways ram from the disc menu.

There was an error in the function key definitions in line 50 of the !Boot Rom program – the bar character is missing. Here is the correct line:

```
50 IF (GET OR 32)=ASC"a" boot$="KEY0*MOUNT|M
*EXEC !Boot|M" ELSE boot$="KEY0 *EXEC
!Boot|M"
```

Hardcopy results

I HAVE found your Pools Predictor in the December 1988 issue of Electron User *very useful, but there isn't a facility to print out the results on the printer. I have made a few adjustments to the program so that it will do this. Insert a line 991 and make it:*

```
991 PRINT
```

This will give a one line space between match draw and results. Change line 1050 to:

```
1050 PRINT "Do you want this information
printed out?":a$=GET$:IF a$="Y" OR a$="y" THEN
VDU2:GOTO 990:ELSE ENDPROC
```

Insert a line 1031:

```
1031 VDU3
```

to switch printer off. Change line 1041 to:

```
1041 PROCWINDOW(6,26,25,3)
```

This should then print all the information table out as neat as it is on the screen.

I like the new look of Electron User *it's better than it was, more modern. I like the software reviews especially.* – **A.R. Coop, Blackpool.**

Long distance problems

I FOUND the phone call calculator a very useful program. It is just what I have been waiting for. Unfortunately, I think there may be an error in the way it selects the time from the data statements. I have modified it as follows:

```
310 pointer=((type-1)*3)+rate
320 FOR j=1 TO pointer
330 READ time
340 NEXT
350
```

Also if you check the BT charges book, long distance calls are in fact what you have put in the menu as Channel Islands and Isle of Man, and what you call long distance really applies to short distance trunk calls. You need to look at the preliminary pages of the phone book as well to see this.

Apologies if I am wrong! I have found the program very handy for foreign calls, and until now had no idea what phone calls actually cost. – **Ian Proctor, St. Austell, Cornwall.**

● You are right, there is an error in the way in which the program reads the data. Barry Wood has had his knuckles severely rapped. Your modification will correct his mistake quite nicely. Thanks for pointing this out.

There are different types of long distance call as there are special low cost routes between major towns like Manchester and London. However, although the distance may be shorter, another call may cost more because of the locations.

The five categories of call in the program should cater for most cases, but you can easily change them to cope with other specific ones, like your foreign calls.

Kicked into touch

I HAVE typed in the Pools Predictor listing from the December 1988 issue of Electron User. *It runs all right until I complete the away teams' results, and then reports* Syntax error at 450. *I have checked and rechecked my typing line by line but cannot trace an error.*

The only thing I can see in the listing is in line 480 which reads:

```
480 DRAW%=100-ABS(WIN-LOSE)-ABS
(HP-AP
```

As you can see, there is no bracket after (HP-AP – this is followed by a blank line. I added a closing bracket to the line but it makes no difference.

I wonder if there is anything else missing from the printing of line 480?

I would appreciate an answer – as you can imagine I would like to try the pools predictor. – **Mrs M. Blakeway, Highbridge, Somerset.**

● The printing on some copies of the magazine isn't too good and the final bracket can't be seen on line 480. You are correct in tagging one on to the end of the line.

The rest of the listing is correct, so please check it thoroughly for typing errors. All the variables are printed in lower case, but the line you list uses capitals all through. Have you mixed the case of some variables? This will certainly confuse the Electron and lead to an error report.

All programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

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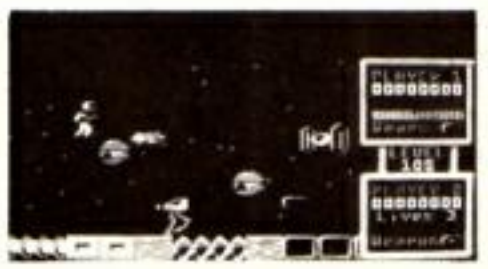

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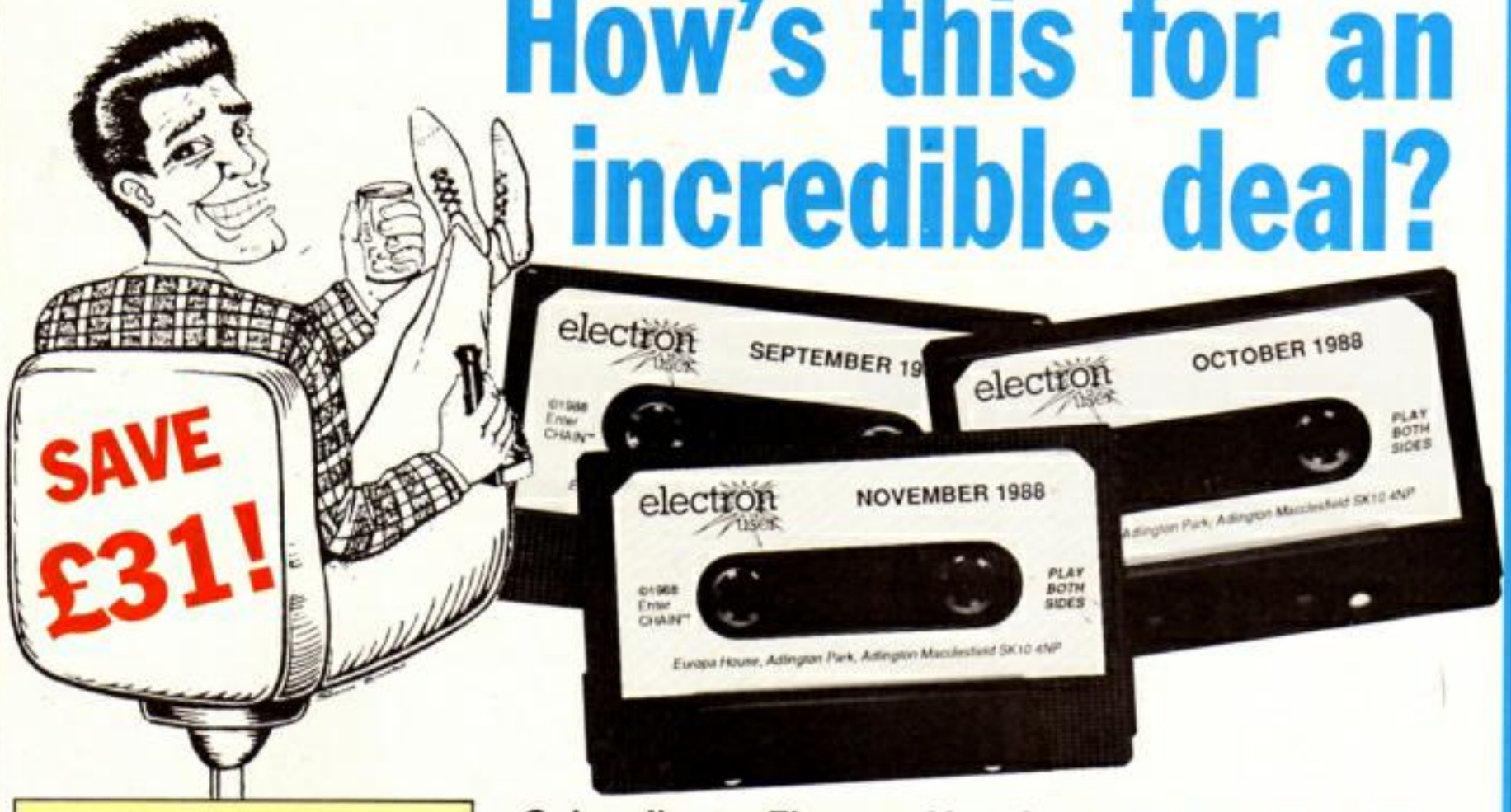

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This product should be in stock by the time this advert appears in the Electron User.

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* JOYSTICK command for the SLOGGER Joystick Interface
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Stripped for action

Give your programs a speed boost with this powerful utility by Roland Waddilove

NO matter how fast our micro is – and the Electron is no slouch – it never seems quite speedy enough when we write arcade games and graphic demonstrations. The hardware solution is to upgrade with a Slogger Turbo or Master Ram Board, and the software answer is to write in pure machine code instead of Basic.

The former is quite expensive, costing as much as the micro itself, while the latter requires an extensive knowledge of both 6502 assembly language and the Electron's inner workings.

So is there an easier way round the problem? The answer is to take a close look at our Basic listings and to try to make them run as fast as possible. This can be achieved by shortening variable names, removing all unnecessary spaces, REMs and so on.

It is surprising what a big difference this makes to program execution times. For instance, enter and run Program I:

```
10 REM Test program
20 TIME = 0
30 sum = 0
40 number = 1
50 start = 1 : finish = 10000
60 FOR loop = start TO finish
70 sum = sum + number
80 NEXT loop
90 PRINT "Time taken = ";TIME/100
```

This listing is 192 bytes long and takes 34.07 seconds to run. As you can see, long meaningful variable names have been used to aid program readability, and all the commands have been spaced out to make them easy to pick out at a glance. However, it takes Basic quite some time to scan the lengthy variable names and to skip all those spaces.

Program II is identical to Program I, except that all the variable names have been shortened to one letter and all the redundant spaces have been removed:

```
20TIME=0
30a=0
40b=1
50c=1:d=10000
60FORe=cTOd
70a=a+b
80NEXT
90PRINT"Time taken = ";TIME/100
```

This program is only 88 bytes long and takes just 26.92 seconds to run. So it is less than half the length and is 1.3 times faster – a significant and worthwhile improvement.

You could write all your programs this way, but, for all but the very briefest listings you would find them quite difficult to follow, understand and debug due to the meaningless single letter variable names used and the squashed commands.

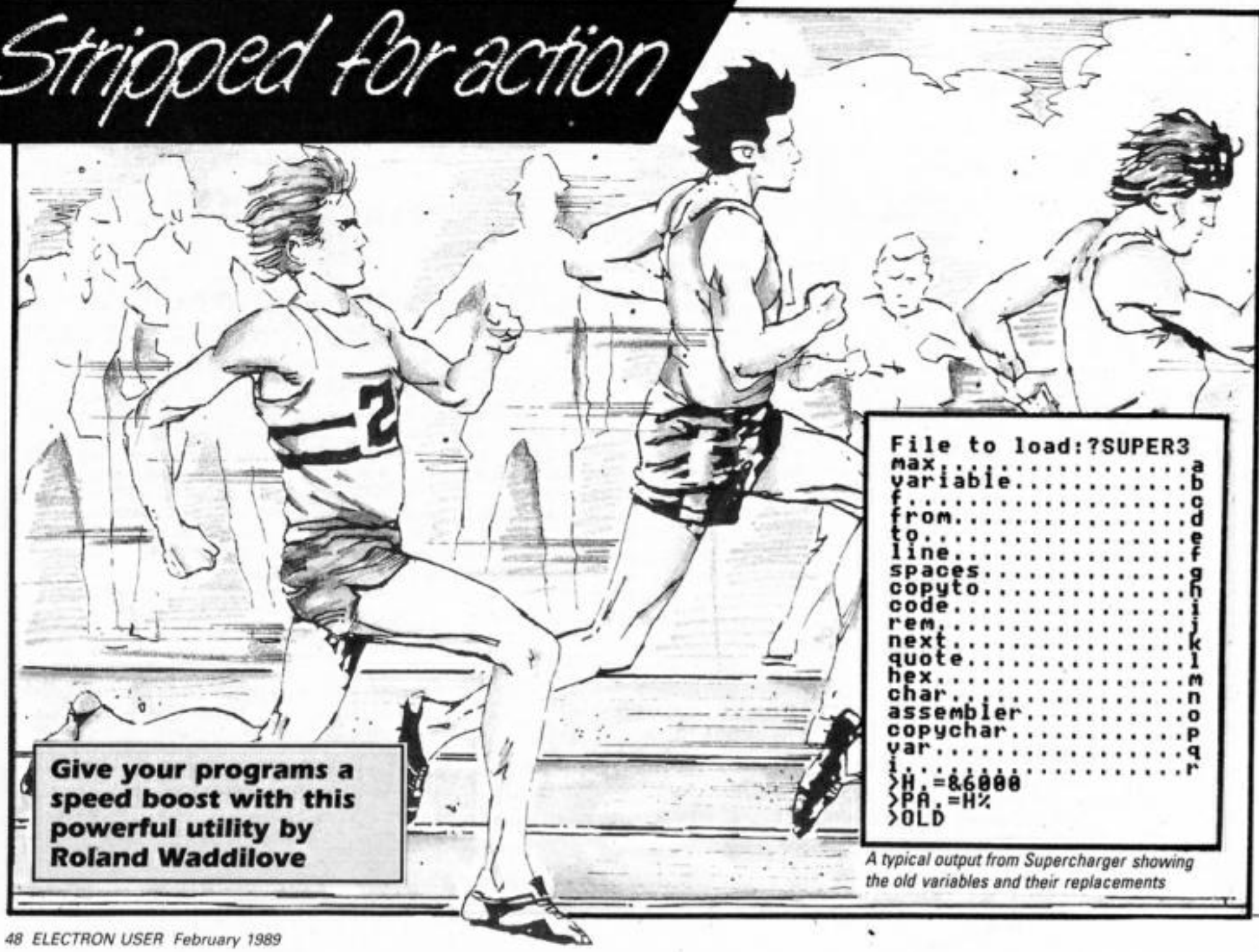
To get round this we can write the program in the first form and use a conversion program to change it automatically into the second, faster version. Supercharger, the utility presented here, is a powerful compaction program which does the trick.

It takes any Basic program, and strips out all the spaces and rems, and shortens all the variable names. It was used to create Program II – the compact version of Program I. In fact if you type in Program II you'll find that it won't work, only Supercharger can create it correctly.

To use Supercharger first enter and save it. Run it and you'll be prompted for the name of a file to compact. Type in the filename and it will be loaded from tape or disc. As it replaces the long variable names with shorter ones it prints them out on screen. You can send them to the printer if you want a permanent record of the changes by pressing Control+B when prompted for the filename.

When Supercharger has finished the conversion the new compact program can be listed by typing LIST and saved with the standard SAVE command. Before running the new program or Supercharger again press Break to reset the micro, as PAGE is raised to the start of the new program.

The Supercharger process is quite complex,



```
File to load:?SUPER3
max.....................abcdefghijklmnopqr
variable................
f.......................
from....................
to......................
line....................
spaces..................
copyto..................
code....................
rem.....................
next....................
quote...................
hex.....................
char....................
assembler...............
copychar................
var.....................
i.......................
>H.=&6000
>PA.=H%
>OLD
```

A typical output from Supercharger showing the old variables and their replacements

though at first sight it may seem quite a simple business to remove spaces and shorten variable names. The first problem lies with strings, for they must be copied character for character, and you can't take any spaces out either. Also in certain cases of IF ... THEN statements without the optional THEN you do need a space. All others can be safely removed.

The old variable names are stored in an array and new ones are allocated starting with *a*. Initially, different single lower case letters are substituted, and if there are more than 26 variables two letters are used.

The reason for using different single letter variable names is that Basic can find them in memory more quickly than ones that all start with the same letter. Single upper case letter variable names are unaltered as A% to Z% have special significance to the operating system.

The variable following NEXT – if present – is also deleted as it isn't necessary. All REMs are taken out as Basic skips these anyway, and although they aid program readability they waste processor time. Blank lines are deleted for the same reason.

All operating system star commands are copied character for character. So too, are data statements so you can't shorten these.

Spaces waste time

You might think that taking out all the spaces from a Basic program would cause countless syntax errors, but you'd be wrong. They are a waste of time and consume valuable memory.

BBC Basic has two modes of operation. In direct mode it responds immediately to keyboard commands; this is the mode entered when you switch on your Electron. It will take any program lines entered and convert them into a special tokenised form before storing them in order in memory.

In direct mode Basic can become confused if spaces are left out between commands and variables, and any lines entered at the keyboard will not be correctly tokenised and stored in memory, leading to error messages when it is later run.

When you type RUN Basic enters its run-time mode in which it executes the commands stored in memory. In this mode no spaces between commands are needed (except in one particular IF ... THEN case) and the program will quite happily run without them.

What Supercharger does is to take the original memory-wasting program and remove all the spaces from each line after they have been tokenised and stored correctly by Basic's direct mode. Execution time will be reduced and useful space will be gained.

You can even use Supercharger on itself to create a souped-up version. As it stands, the listing is around 2k long, but you can compact it to just under 1.5k by first saving it then entering its name at the filename prompt when it is run. Save the compacted version and use this instead of the original.

Assembly language

Unfortunately, assembly language sections can cause severe problems to Supercharger, so they must be avoided. The problem lies in the fact that these sections are not stored in the normal Basic manner, so the compaction algorithm won't work.

When Supercharger comes across any assembly language sections compaction is temporarily suspended. It resumes with the next chunk of Basic. Any Basic variables referred to in the assembly language section will not be changed automatically. However, armed with a printout of the variable list, you could change them manually.

```
10 REM Supercharger
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MODE6
50 HIMEM=(TOP+1100)AND &FF00
60 max=75:H%=HIMEM
70 DIM variable$(max)
80 INPUT ' "File to load:";f$
90 OSCLI"LOAD "+f$+" "+STR$~HIMEM
100 from=HIMEM:to=from
110 REPEAT
120 T%=to
130 PROCline
140 IF to-T%>4 T%?3=to-T%:T%=to ELSE
to=T%
150 UNTIL from?1=&FF
160 !to=&FF0D
170 *KEY0 H.=&6000|MPA.=H%|MOLDIM
180 *FX138,0,128
190 END
200
210 DEF PROCline
220 !to=!from
230 from=from+4
240 PROCspaces
250 IF ?from=13 ENDPROC
260 to=to+4
270 IF ?from=ASC"*" OR ?from=&DC PRO
Ccopyto(13):ENDPROC
280 REPEAT
290 PROCcode
300 UNTIL ?from=13
310 ENDPROC
320
330 DEF PROCcode
340 PROCspaces:IF ?from=13 ENDPROC
350 IF ?from=ASC"*" AND ?(to-1)=ASC"
:" PROCcopyto(13):ENDPROC
360 IF ?from=&F4 PROCrem:ENDPROC
370 IF ?from=&ED PROCnext:ENDPROC
380 IF ?from=&8D !to=!from:from=from
+4:to=to+4:ENDPROC
390 IF ?from=34 PROCquote:ENDPROC
400 IF ?from=ASC"&" PROChex:ENDPROC
410 IF FNchar(?from) PROCvariable:EN
DPROC
420 IF ?from=ASC"[" PROCassembler:EN
DPROC
430 PROCcopychar
440 ENDPROC
450
460 DEF PROCnext
470 ?to=?from:to=to+1
480 REPEAT
490 IF ?from=ASC"," ?to=?from:to=to+
1
500 from=from+1
510 UNTIL ?from=ASC":" OR ?from=13 O
R ?from>127
520 ENDPROC
530
540 DEF PROCrem
550 REPEAT
560 from=from+1
570 UNTIL ?from=13
580 IF ?(to-1)=ASC":" to=to-1
590 ENDPROC
600
610 DEF PROChex
620 REPEAT
630 PROCcopychar
640 UNTIL INSTR("0123456789ABCDEF",C
HR$(?from))=0
650 ENDPROC
660
670 DEF PROCspaces
680 IF ?from=32 from=from+1:GOTO 680
690 ENDPROC
700
710 DEF PROCvariable
720 IF FNchar(?(to-1)) ?to=32:to=to+
1
730 var$=""
740 REPEAT
750 var$=var$+CHR$(?from)
760 from=from+1
770 UNTIL NOT FNchar(?from) AND (?fr
om<ASC"0" OR ?from>ASC"9")
780 IF LEN(var$)=1 AND var$<="Z" ?to
=ASC(var$):to=to+1:ENDPROC
790 i=-1
800 REPEAT i=i+1
810 UNTIL var$=variable$(i) OR varia
ble$(i)="" OR i=max
820 IF i=max AND var$<>variable$(i)
PRINT"Too many variables!":STOP
830 IF i<26 ?to=97+i MOD26:to=to+1 E
LSE ?to=97+i MOD26:to?1=96+i DIV26:to=
to+2
840 IF variable$(i)>"" ENDPROC
850 variable$(i)=var$
860 PRINT var$;STRING$(20-LEN(var$),
".");
870 IF i<26 PRINTCHR$(?(to-1)) ELSE
PRINTCHR$(?(to-2))CHR$(?(to-1))
880 ENDPROC
890
900 DEF FNchar(T%)
910 =(T%>64 AND T%<91) OR (T%>94 AND
T%<123)
920
930 DEF PROCquote
940 PROCcopychar
950 REPEAT
960 PROCcopychar
970 UNTIL ?(from-1)=34
980 ENDPROC
990
1000 DEF PROCcopyto(C%)
1010 REPEAT
1020 PROCcopychar
1030 UNTIL ?from=C%
1040 ENDPROC
1050
1060 DEF PROCassembler
1070 REPEAT
1080 PROCcopychar
1090 UNTIL ?from=13 OR ?from=ASC"]"
1100 IF ?from=13 T%?3=to-T%:T%=to:!to
=!from:to=to+4:from=from+4:PROCspaces
1110 IF ?from<>ASC"]" GOTO 1070
1120 ENDPROC
1130
1140 DEF PROCcopychar
1150 ?to=?from:from=from+1:to=to+1
1160 ENDPROC
```

electron user MAIL ORDER OFFERS

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A stitch in time

A host of hints and tips for looking after your micro, provided by Francis Botto

HAVING now graced this planet for almost five years, the Electron has carried on the Acorn tradition for reliability with honour. If ever there were a vandal proof machine the Electron must surely be it. Any machine capable of withstanding the rigours of children's sometimes vicious fingers in some of our schools each and every day must claim to be a micro among micros.

I say this as a programmer of educational software and a frequent visitor to a school. Among other things this involves checking out every single piece of computer hardware, and it never ceases to amaze me the strange places Electrons are to be found in.

Only last week I found one upside down beneath a pile of cardboard. When I finally uncovered the machine it was liberally coated with the thickest film of dust I've ever seen – obviously accumulated at some other stress testing time.

After finding its accompanying disc drive – which was in a sink of all places, a dry one though – I set it up, and surprisingly it worked first time. Give that machine a medal!

Preparing for failure

Taking note of Murphy's Law, that if something can go wrong it probably will, you have no option but to assume that one day your Electron – however well looked after – may throw a tantrum.

And knowing your luck, it will happen just as you're about to save two hours' programming. So it's as well that you prepare for that rare failure.

It is quite likely that you have no warranty to fall back on, and the burden of breakdowns rests firmly upon your shoulders. So it's just as well to take a little extra care of your micro – not that you'd consider anything less. There are a few things you can do to avoid the unwelcome event of a machine failure as well as a number of countermeasures that can be taken to minimise the effects of a breakdown should the worst occur.

Disc drives with their sophisticated mechanics remain a mystery to most of us. You put your disc in and like magic it obeys your every command. But there's something unfriendly about them at times, as they can cause occasional disc corruption.

Naturally, any level of data loss inflicted by a drive is not the most convenient thing that can happen, so apart from never interrupting read/write operations, you should regularly update backup copies.

You need reasonable quality discs – remember poor ones won't do your drive any good, particularly those that make a loud hissing noise when rotated. That doesn't mean to say you should only buy the very best, but you should accept that if a disc is so poor it leads to numerous error reports then it's time to call it a day and frisbee it out of the window.

If you have experienced computer failures in the past, and you know your Electron is particularly prone to blowing certain devices, you could prepare. For example, BBC Micros had a one-time reputation for blowing 74LS245 data buffers, so owners used to keep one spare. You may think this a little drastic, but there again if you are prepared you are less likely to be left in the lurch if a computer repair company hasn't got the right part.

Avoiding a breakdown

Of the varying degrees of failure, perhaps the worst effects are experienced following a drive breakdown. Care of your drive is therefore essential, and you could do no better than use a head cleaning kit from time to time.

In the case of the Electron, a breakdown is more likely to be caused by a mechanical fault rather than an electronic malfunction. It makes sense therefore, to take care of your keyboard, which basically means covering it when not in use as dust can reduce its life. With keyboard assemblies ranging from £26 to around £36 it makes sense.

The real mechanical trouble makers are indisputably plugs, sockets and leads. Caring for these items is fairly straightforward, for example, avoid stretched or kinked leads, and take care while plugging and removing them. Don't ever perform such operations when your machine is switched on.

All micros tend to over-react to the slightest variations in mains supply, and like its counterparts the Electron will tend to do strange things in response to a spike – a fleetingly short and abrupt change in the supply. These hiccups are most often caused by heavy electrical appliances like industrial machines or lifts, but spikes can also be caused by domestic appliances being switched on or off. This is sometimes referred to as switch bounce.

If your programs inexplicably crash now

◀ From Page 51

and again or you lose sections of program or text, you may well have a spike problem. To remedy this sometimes infuriating situation you'll need a spike supressor which you can get from most good computer dealers or chain store outlets specialising in electronics.

Coping with a sick micro

Just imagine for one moment, that the worst has happened Your micro has broken down and the guarantee period has well and truly expired. Your first reaction might be to contact a computer repair company at random. Not recommended. You might even call your local dealer. Not recommended.

Assuming you have no maintenance contract, it's advisable to stop pulling your hair out and check to see whether or not your computer has actually failed. For example, blown fuses often make it look as if something catastrophic has occurred. When you have checked the obvious and you are satisfied you can do nothing to remedy the situation, it's probably time to throw in the towel and seek professional help.

Searching for a good repair deal isn't quite as black and white as you may think, as there are a whole host of considerations. For example, is the repair company Acorn approved? How long will the guarantee last? When will you get your micro back? Do they have automatic test equipment to locate components about to fail?

How much will it cost? Will it be a standard charge or will they come back to you repeatedly for more money – you know, like the car mechanic who says he can get your 1970 MG through the MOT test?

Beginning with the last question, I might be sticking my neck out here, but I think a standard charge irrespective of the type of repair is by far the better deal, because let's face it, there's nothing worse than them wanting more and more money.

With regard to diagnosing components about to fail, there is a lot to be gained from this type of service, as a future breakdown can be avoided – so ask if they've got such facilities.

Turnround period is again worth considering, particularly if you use your Electron professionally. If you are assured that your computer will be repaired within a day this can be a good sign and could mean they have up-to-date diagnosis equipment.

It's always worth looking for a reasonable period of guarantee – about three months is average. And sometimes it's worth paying a little extra for a longer warranty period – peace of mind and all that.

You should look first for an Acorn-approved service centre or repairer. And as for prices, well these tend to vary from anything between £17 and £28 – so shop around.

And one last word of warning about prices – as the Electron is an inexpensive used machine, be careful you don't go paying more than its worth – it might just be cheaper to buy another Electron.

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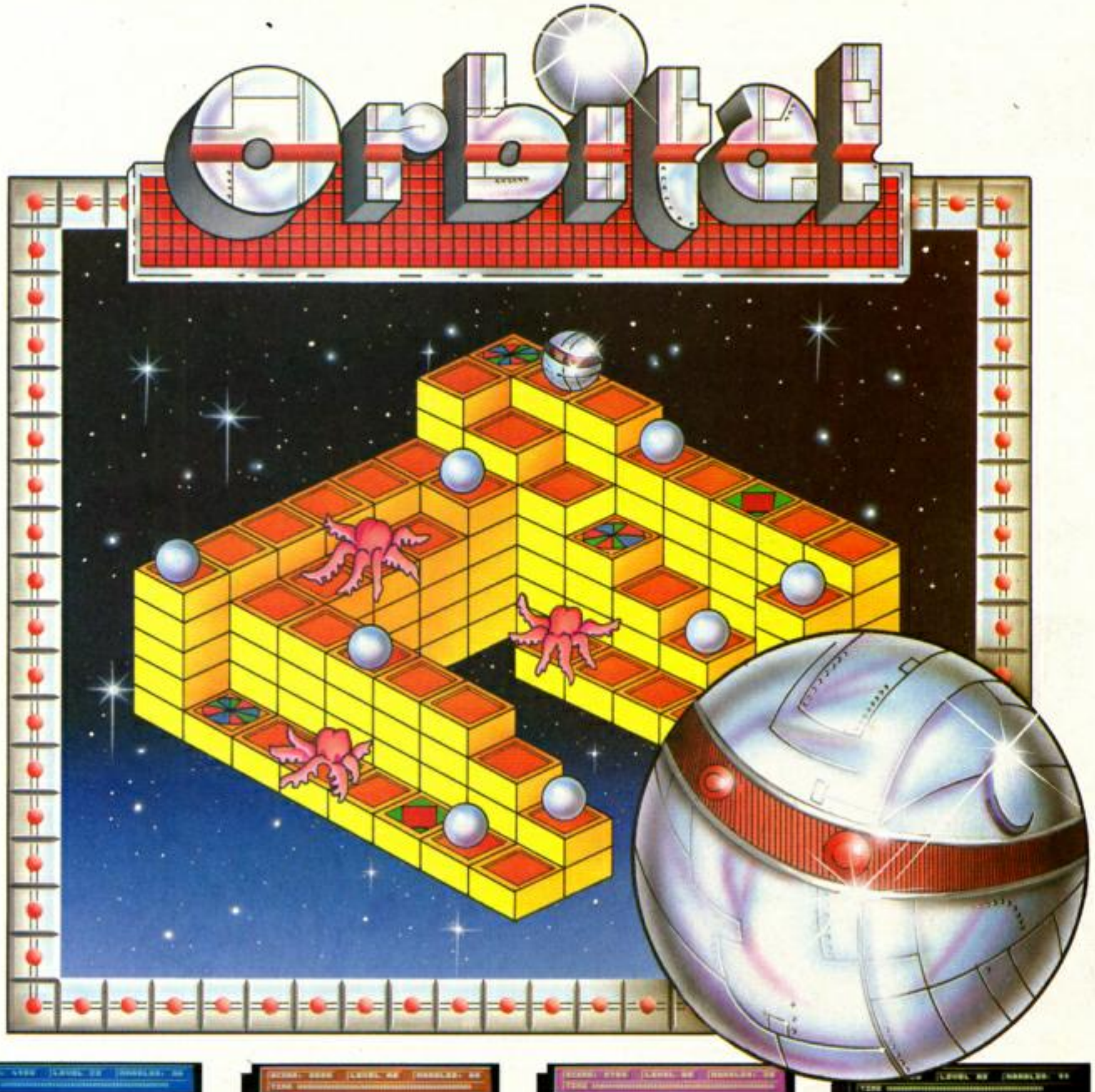

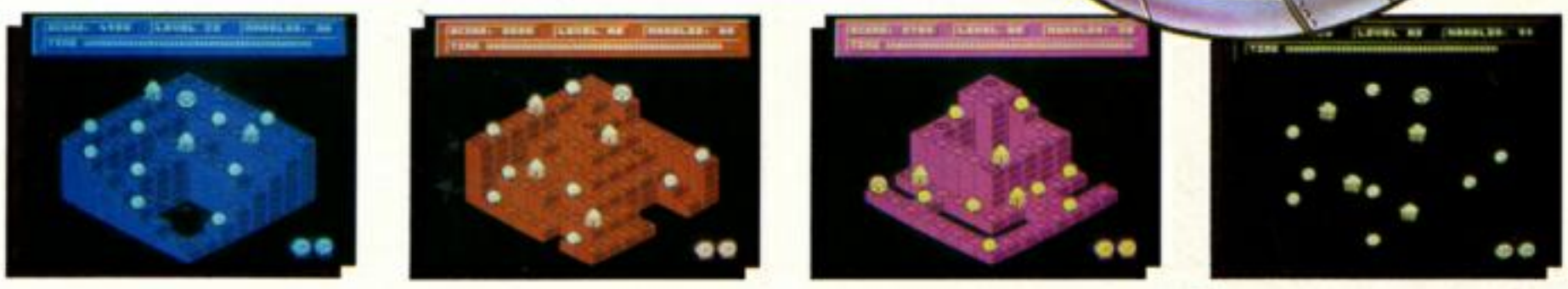

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